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TRANSACTIONS

OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1916

PART I

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND SIXTEEN

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OF THE

Massachusetts Horticultural Society

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PART I

BOSTON
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Massachusetts Horticultural Society.

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* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

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Massachusetts Horticultural Society.

1916.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

Wilfrid Wheeler, *Chairman*
John K. M. L. Farquhar
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Committee on Lectures and Publications.

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THE INAUGURAL MEETING, JANUARY 8, 1916.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1916, PART I.

INAUGURAL MEETING.

The Inaugural Meeting of the Massachusetts Horticultural Society for the year 1916 was held at Horticultural Hall, Boston, on Saturday, January 8, at eleven o'clock.

The call for the meeting was read by the Secretary and Mr. Farquhar, the retiring President, introduced the new President, Richard M. Saltonstall, who proceeded to give the following inaugural address:

Inaugural Address of President Saltonstall.

Ladies and Gentlemen,

Members of the Massachusetts Horticultural Society.

Our Society, incorporated as it was in 1829, is now about to enter upon the 87th year of its existence.

The traditions of the Society are such that it is a great honor to serve as the chief executive officer in the conduct of its affairs. Heretofore I have enjoyed the rather meagre opportunities to be of service to the Society as a Trustee, and at times as legal advisor, and I can assure you most sincerely that I appreciate deeply the responsibility of the office to which you have now elected me, and that I will give my earnest and best efforts to promote and carry forward the good work of the Society along the lines now so well established by my predecessors.

The work of Mr. Farquhar, my immediate predecessor, who has served our Society as President for the past three years, deserves the highest praise from us all. It is seldom that you find one who has such an extended scientific knowledge of horticulture in its fullest meaning, combined with long business experience and first class executive ability, and perhaps more important still, an acquaintance with all the best horticulturists, not only in this country, but in all quarters of the globe where there are any horticultural interests. Can any one who saw that wonderful field of Chinese Lilies (*Lilium regale*) in bloom last summer at Mr. Farquhar's place, fail to recognize his ability to propagate and introduce to lovers of flowers in this country the many attractive new varieties which have been recently brought to us from China and other far away parts of the world. Such have been the qualities of your late President, and I take great pleasure in extending to him the thanks of our Society and the earnest hope that he will continue for many years to participate with us in the conduct of its affairs.

Your Trustees have given careful thought at their meetings during the year to various matters of interest to the Society.

At the Annual Meeting a year ago, Mr. C. H. W. Foster, one of our well-known members, offered a resolution that the Trustees consider the expediency of making changes in our building which might result in a better commercial return from the property.

This property, as it stands on our books today, represents an investment of something over half a million dollars, $515,000.00, about $225,000.00 in land and about $290,000.00 in the building. A committee of your Trustees gave much time to this question of altering the building, and consulted with three very well-known architects. All of us must admire the dignified character of the exterior lines of our building, and to undertake to change these outside walls without obliterating the attractive architectural features, is almost an impossibility.

There is undoubtedly a quantity of interior space in the building which is largely wasted, but to render this space useful either for commercial use or for the use of our Society would require an expenditure of not less than $150,000.00, and some of the estimates ran up to nearly $200,000.00.

Our land is undoubtedly increasing in value as business is moving

up Huntington Avenue, and Massachusetts Avenue is fast becoming an important cross-town thoroughfare. Although the Society pays no city tax, our property is assessed and our land alone last year was assessed for $450,000.00.

The Committee and your Trustees unanimously feel that the wise course to pursue is to expend no further large sum on this building, but to wait until we can sell our present property without loss, and then move to some location where we can build anew. We have so informed Mr. Foster, who also considered the matter independently and are glad to find that he concurs in this decision. It is possible that some changes can be made in the walls of the large Hall which would be helpful in the artistic arrangement of our Shows.

The outdoor meetings conducted by Professor Jack at the Arnold Arboretum for the benefit of our members and their friends have proved to be quite popular. It certainly is a practical and attractive way of bringing to notice the many new varieties of flowering shrubs and trees at the Arboretum, and this work will be continued and extended from year to year if our members show by their attendance that it is appreciated.

Possibly it may become desirable to establish classes for instruction in the various branches of gardening, such as preparation of the soil, planting, propagating of plants by cuttings, pruning of shrubs and trees, demonstrations in the orchard of best methods for the care of fruit trees, and field meetings at noteworthy and successful commercial nurseries.

It is work of this kind along new lines from year to year that will keep alive the interest in our Society. We must not direct our efforts too much along beaten tracks, and any suggestion from members as to work to be undertaken will always be cordially considered by the Trustees.

The success of this Society in the future depends primarily, you may say, upon adhering to *good business principles* in the application of our funds, and the first business principle to apply is that we should live within our income. Our land, building, and contents are carried on our books at about $575,000.00; we certainly can be proud of our Library which is one of the very best of its kind in the world. It has at present about 25,000 volumes. In addition

to this property, which yields but a comparatively small income, we have invested funds amounting to $271,580.14, of which $61,463.61 are held for special purposes.

From our invested funds we receive an annual income of about $12,000.00 a year, $2,500.00 of which must be specially applied, and our income from all other sources which includes membership fees, use of building for exhibitions and other purposes, state aid, donations, and Mt. Auburn amounts to something over $9,000.00, or a total income of about $21,000.00; I regret to say that the Treasurer's figures when analyzed show that we are living beyond our income, or in other words, for the last four years have used part of our capital to pay running expenses.

In order to show more graphically what I mean, let us put the receipts and expenses for these past four years in parallel columns:

Year	*Receipts*	*Expenditures*	*Excess of Expenditures*
1912	23,049.55	23,795.29	745.74
1913	25,485.00	29,241.25	3,756.25
1914	21,157.42	23,971.87	2,814.45
1915	21,977.93	22,366.27	388.34
Total	$91,669.90	$99,374.68	$7,704.78

We all know that if we live on our capital instead of our income, we are certain to come to grief, and these figures indicate that in the last four years instead of adding something to our capital, we have diminished it by the amount of $7,704.78. If we had not used up this amount of capital, our annual income, figuring at 5%, should be about $380.00 more per year than it is at present.

It is too clear for argument that we must rectify this situation either by increasing our income or decreasing our expenses. I believe that there is opportunity by united effort to do both. We should get a better net return from our exhibitions.

In 1912 we received a net return from exhibitions of $3,099.62
" 1913 " " " " " " " " 1,116.42
" 1914 " " " " " " " " 689.25
" 1915 " " " " " " " " 2,097.22

These figures show a great variance in results. Why is it? Are our exhibitions fully advertised? Are they made to satisfy popular demand? These are questions which can be well considered with a view to swelling our treasury return from this natural source of revenue.

The membership of the Society should be larger. We should attract members from all over the State, and this would afford not only increased dues but added interest in the work of the Society. In 1914, the Trustees directed the Treasurer to apply $25.00 of each Life Membership fee to the Permanent Funds of the Society which is certainly right. At present we have 773 Life Members and 161 Annual Members. We should increase our membership by at least 100 a year. In 1871, this Society had a membership of 1035.

In 1914 the Trustees also directed the Treasurer to apply one-half the receipts from Mt. Auburn to the Permanent Funds. This certainly should be continued for the reason that the lands from which our Society receives a portion of the sale price are fast being sold and we should try to establish a fund from which the Society will get a return after these lands are all sold and revenue from this source ceases.

It is interesting to note at this time that the enterprise shown by this Society in purchasing in 1831, two years after its organization, the land at Mt. Auburn for the purpose of an experimental garden and rural cemetery, although it proved to be not practical from an operating standpoint, did, however, prove to be one of the most fortunate things our Society ever undertook from a financial standpoint, we having realized a constant revenue from the sales of the land since the property was turned over to the Proprietors of the Cemetery in 1835.

When one comes to consider the expenditures, it is hard to undertake to say where we can best make a saving. We must practice general economy hoping that by so doing we will in no way curtail good results. The annual expenditure for the Library seems to me small, as compared with other expenditures, and I mention this as it would not seem to me advisable to attempt to curtail on Library expense.

I believe we can reduce the amount appropriated for money

prizes at the Exhibitions by still further reducing the number of Large Exhibitions which last year were twelve in number, and which I submit might well be reduced to eight.

This matter of exhibitions has received much attention of the Trustees, and we are adopting a new policy for next year and for several years thereafter. You will remember that at the last annual meeting, the By Laws were so amended as to allow the awards and prizes to be fixed in advance for a longer period than one year; i. e., for not exceeding three years in advance.

The Trustees believe it advisable to have two annual exhibitions — one in the Spring and one in the Fall — on a larger scale than the other exhibits during the year; to do this, it will be necessary to offer larger prizes calling for exhibits which it may take the growers a longer period than a year to prepare for. It is expected that this can be done without increasing the expense to the Society by securing contributions from members and friends of the Society for the Special Prizes and from the larger returns which should be derived from such a Show.

The first large Show is to be held May 10–14, 1916, and I ask you all to bear this Show in mind, encourage exhibitors to send in their plants and encourage a large attendance. I am glad to be able to tell you that the $1525.00 required for the Special Prizes has all been paid in or subscribed for by members of our Society.

The interest of amateurs as well as that of professional or commercial gardeners must be considered constantly. It is largely due to the zeal and interest of our amateur members that our permanent funds have been increased from time to time by handsome bequests and donations.

It will add much interest to our Shows if we can encourage a wider field of exhibitors and will certainly add to the attractiveness of the Shows. The Trustees are proposing that every two weeks there shall be smaller shows at which no money prizes be awarded, but gratuities and certificates, and these shows should certainly appeal to the amateur growers. For many years during the early history of this Society, the weekly exhibits were most successful and apparently money prizes were not awarded. It is along these lines that we are proposing the fortnightly shows.

I earnestly hope that our Committee on Fruits will do all it can

to stimulate the waning interest in pear culture. Much has been said of late about apples, but I have noticed little, if anything, about pears. I believe there are only about three or four places in Boston where one can find for sale a variety of pears. Why is it so? Over in New York you find good pears in almost all the fruit stores, and they appear to be much sought after. I truly believe there is as much, if not more, money in raising good pears as in apples.

In reading the account of the Shows held during the first fifty years of our Society life, I was much impressed with the account of the fruit exhibits and especially of the pears; for example, at the fair held in 1871, Mr. Marshall P. Wilder was awarded a prize for 42 new varieties of pears. At our recent shows, I doubt if there have been 25 different varieties of pears exhibited. In the 1875 show, there were six hundred seventy-nine (679) dishes of pears and one hundred and seventy (170) of apples.

I look forward to the coming year with bright expectations for our Society and I ask the coöperation of our various committees and our active members to help in every way they can to make our Shows and our efforts in other directions successful in their results.

At the close of his address the President called for the annual reports of the officers and chairmen of committees which were given in the following order:

Report of the Treasurer, Walter Hunnewell.

Report of the Board of Trustees, by the Secretary.

Report of the Committee on Prizes and Exhibitions, James Wheeler, Chairman.

Report of the Committee on Plants and Flowers, T. D. Hatfield, Chairman.

Report of the Committee on Fruits, Edward B. Wilder, Chairman.

Report of the Committee on Vegetables, Duncan Finlayson, Chairman.

Report of the Committee on Gardens, John K. M. L. Farquhar, Chairman.

Report of the Committee on Children's Gardens, Henry S. Adams, Chairman.

Report of the Delegate to the State Board of Agriculture, Edward B. Wilder.

Report of the Committee on Lectures, Wilfrid Wheeler, Chairman.

Report of the Secretary and Librarian.

The reports as presented were severally accepted and referred to the Committee on Publications for record in the Transactions of the Society.

The matter of securing a larger attendance at the meetings of the Society was discussed by several members present and it was voted to request the Trustees to consider the subject and to see if something could not be done to increase the interest in these meetings.

The meeting was then dissolved.

William P. Rich,
Secretary.

ALFALFA CULTURE IN NEW ENGLAND.

By Prof. S. C. Damon, Kingston, R. I.

Delivered before the Society, February 5, 1916.

Alfalfa is the oldest agricultural plant in history, the third in value in the United States, and almost the latest to invade conservative New England agriculture.

There is no more interesting, important, and often profitable part of an up-to-date farmer's business than the trial of new seeds and plants. Here now, we have this alfalfa plant, a comparatively new introduction into the United States, making every year a more persistent claim for our attention and asking for a trial on every New England farm. But first let us get more acquainted with this wonderful legume: a perennial in its nature, this "Child of the Sun," as its name Lucerne implies, this "best of all grasses" as the name signifies. I referred to alfalfa as being new to this country. It is comparatively so, but in the history of agriculture, it is the oldest of all forage plants, for it is mentioned in Roman history 2500 years ago, when its virtues were known and recorded by Pliny, one of their greatest writers.

Alfalfa was introduced into the United States in 1854, probably by some gold hunters, who, in their journey to California by the way of Cape Horn, stopped at some port on the South American Coast, perhaps Chili, where they saw this wonderful plant growing and it attracted their attention so much that they took some of the seed with them to California, whence it has spread all over the West.

The introduction of alfalfa into the eastern part of the United States was brought about in an entirely different manner. It was through the foresight of a German, Wendell Grimm, who, coming to make his home in this new country in Minnesota in 1857, naturally brought with him a little seed of the crop which he prized most highly in his old home and that is said to be the origin of the famous Grimm alfalfa.

To grow alfalfa successfully here in New England, let us first find out what is adverse to its culture.

First, the Soil. Most of our soils are naturally well drained, so that there is n't the necessity of tile draining in preparation for alfalfa that there often is in the Middle West. The first requisite to successful fields of alfalfa, that the water-table shall not be within 3 or 4 feet of the surface, is thus met.

How about the soil? Most of the New England soils are of glacial formation, and while they do possess many qualities favorable to alfalfa growing, there is one very essential ingredient in which they are generally deficient and that is lime. Alfalfa is above all a lime-loving plant, and so dependent upon lime is it that there is small chance of establishing a permanent field unless there is naturally or has been applied sufficient lime to correct the naturally acid condition of the soil.

This plant belongs to the legumes, a class of plants that have on their roots when growing in a neutral or alkaline soil, numberless small nodules that contain the numerous nitrogen-gathering bacteria. These have the power to draw nitrogen from the air and by symbiotic action benefit the plant during its growing period. These organisms cannot live in an acid soil. Neither does a crop of alfalfa thrive unless the roots are well noduled, hence the necessity of frequent and liberal applications of lime. The element, nitrogen, is the most important to all plants and the most expensive to purchase, so all that can be drawn from the air should be used. A ton of alfalfa hay contains 44 lbs. nitrogen, so that a crop of 4 tons per season, not an unusual crop, would contain 176 lbs. nitrogen, at 15c lb. equals $26.40, two-thirds of which, according to Whiting, is taken from the air by the bacteria on the roots. What a vast gain, when we consider further that about one-third of the nitrogen in the whole plant is in the roots. The fertilizer value of the roots and stored fertility, according to Professor Voorhees, from an acre of alfalfa is $65.00.

The second benefit of lime when applied to our New England soils is to furnish sufficient calcium for the needs of the plants, for a ton of alfalfa hay contains 59.86 lbs. of lime or a four-ton crop would remove 236 lbs. of actual lime per season from the soil.

It has been well settled that alfalfa will not grow upon an acid

soil. That acidity stands for failure, hence test the soil of a new field before planting it and make sure that the reaction of the soil is right at the outset.

The two forms of lime most used in agricultural practice are air-slaked lime and ground limestone. They are both good undoubtedly but those of you who have had the pleasure of hearing the late Joseph E. Wing give in his inimitable way his reasons for using carbonate of lime for alfalfa fields are convinced of the desirability of always using ground limestone. The only way in which we are likely to fail is in not using enough. The growing of alfalfa resolves itself, then, into a chemical problem.

Selection and Preparation of Field.

For the first planting of alfalfa on one's farm it is preferable to select a field of good sandy loam. It might still further be defined as good corn land soil.

It is best to use a field that has been under cultivation the previous season in some hoed crop, and is thereby well cleaned of weeds. In the spring the first operation is to broadcast over the field a good application of eight cords of stable manure per acre if available, to be plowed in deeply and thoroughly. The manure is doubly valuable to use here, not only for the plant food it contains but for its humus and for its physical effect in the soil, making it more friable and materially increasing its water-holding capacity, but perhaps the most valuable benefit is that it carries into the soil the numerous bacteria that it contains and that are so helpful in creating a productive soil.

Lime.

The lime necessary should now be applied at the rate of at least two tons of air-slaked or four tons of ground limestone per acre and thoroughly harrowed into the soil. The seed bed should be made firm below and fine and loose on the surface for the following reasons: a firm, compact soil is very much the best for capillary

action in the soil and moisture will rise much more readily to assist in the germination of the seed. The soil in which the seed is planted should be made fine by repeated workings so that each seed may be completely surrounded and enveloped in a coat of soil grains, thus insuring good germination.

Inoculation.

The question of whether to use air-slaked or pulverized limestone is not so important as it is to use sufficient lime in either form to correct the soil acidity because the bacteria that we want to have grow in the alfalfa soil and that are often found attached to the small roots thrive only in an acid-free or alkaline soil.

These bacteria have the power to assimilate nitrogen from the air, a remarkable function but one that works great benefit to the plant on whose roots the bacteria live. So important is this function that the plant not only receives sufficient nitrogen to produce a large growth of green tops but there is stored in the roots from $25 to $30 worth of nitrogen per season.

To bring this condition about, if alfalfa is to be sown on a field where it never grew before it would be very much more likely to succeed if it were inoculated. There are two ways of accomplishing this, now in common practice. One is to bring soil from a field where alfalfa is growing successfully and that had nodules on the roots. Take about 500 pounds per acre to the new field and sow it broadcast, on a cloudy day preferably, and harrow it well into the soil. That is all that is necessary. Then when ready sow the seed as usual.

The other way is to procure from the U. S. Department of Agriculture, that will send to each applicant enough artificial cultures of the bacteria to inoculate an acre; or similar cultures may be bought of the manufacturers. These artificial cultures are used on the seed by treating it according to directions. Then the seed is sown in the usual way and the seeding completed. Either of these methods is usually successful and the one to be used would usually depend upon whether one could get soil from a nearby alfalfa field or if that would be too expensive, then use the second method which should not cost over $2.00 per acre.

Fertilizing.

In the preparation of the field for seeding, it is not always possible to use sufficient stable manure and so fertilizer chemicals are used. It has been found profitable to use a fertilizer containing available nitrogen at the time of seeding because of the great benefit to young legumes by having soluble nitrogen present as demonstrated by the late Professor Hellriegel of Germany. The alfalfa plant is no exception to this rule, for no matter how sturdy it may become in its maturity, in its earlier stages it is weak and tender.

The fertilizer should be further made up of from 300 to 500 lbs. of acid phosphate or better Thomas basic slag and 200 to 300 lbs. of potash salt, preferably the sulphate, for according to Doctor Brooks the yield of hay from sulphate exceeded that from muriate by 18 per cent. After the field is well established, it is good practice to annually top dress each spring with 300 to 500 lbs. of acid phosphate or basic slag and 200 to 300 lbs. of sulphate of potash.

Seeding.

After the inoculation and fertilizers have been sown and thoroughly harrowed into the soil, the seed bed levelled and smooth, it is ready to sow the seed. There are two times in a season when a field may be successfully seeded. One is very early in the spring, say by April 10, and the other is after an early crop of potatoes or grain, that is, from July 15 to August 15. The thing to be desired in seeding is to sow at such a time that the crop may make a successful growth ahead of the weeds.

The variety and amount of seed to use per acre is important. There is no better variety that we know than the Grimm, spoken of earlier in this talk, although there are numberless varieties being grown and studied at some of the Experiment Stations.

Any northern grown seed like that of the Canadian variegated, Sand Lucern, Baltic, Minnesota or Dakota grown seed can be used with safety and usually found reliable.

A pound of alfalfa seed contains approximately 220,000 seeds,

enough to plant 5 seeds per sq. ft. on an acre, but as there is the difficulty of even distribution and loss from poor seed or the seeds not being covered, it is best to sow 15 to 20 lbs. per acre. If drilled in, the 15 lbs. is sufficient; if sown broadcast, sow 20 lbs. per acre.

In a comparison of 10 and 20 lbs. of seed per acre made at Wisconsin and reported in Bul. 259, it was found that with 10 lbs. of seed per acre there was more trouble from weeds and blue grass, that the alfalfa grew a little taller, while 20 lbs. to the acre gave hay of a better quality, a thicker stand and a larger yield.

Harvesting.

When to cut a field of alfalfa for hay is best determined by an examination of the plant, both as to blooms and more especially as to the appearance of the sprouts at the base of the stems. The crop should be cut before the new shoots are tall enough to be clipped by the mower, else the next crop will be much injured. The rule to cut when the field is about one-tenth in bloom is also sometimes followed but the best authorities on alfalfa growing say to be guided by the new shoots and always cut when they are well started.

In this connection, I would call your attention to the record of yields from two equally good fields of alfalfa at the Rhode Island Experiment Station. One was cut when the plants had about reached maturity but neither blossoms nor sprouts were visible. The other field was cut at the proper time. The total yield from the three cuttings, the third or last being made at the same date on both, was in favor of the mature rather than the very early cuttings: Early 4.24 tons, Mature 4.50 tons.

Curing the Hay.

It is good practice to begin mowing as soon as the dew is off in the forenoon and then rake into small windrows about four o'clock. Then either make small haycocks at once or let it lie until the next day and turn it and then cock it.

The theory of curing alfalfa is to save all the leaves on the plant for 45 per cent of the protein of the hay is contained in the leaves. This is best done by raking before the leaves dry to a crisp. In the wilted stage they continue to draw water from the stems and evaporate it, thus the process of curing goes on in the haycock. Some have adopted drying racks for curing alfalfa hay. The wilted alfalfa is piled on these at once from the windrow and with a hay cap on the top is safe from any storm that may come. A week's time is usually sufficient to cure the rack of hay thoroughly when in the middle of a good bright day it is drawn directly from the stack to the barn. As a safeguard to preserve the stand, it is not best to cut later than September 5.

Yields per Acre.

The average yield per acre here in New England is about 3.2 tons per season, according to Doctor Brooks, in his coöperative experiments. It is usual to cut three crops and of course the first is the heaviest. The amount of the other two depends upon the amount of rainfall through the growing season. The first crop usually is above two tons per acre and each of the other two, one ton each.

As to the risk from storing alfalfa hay too green, I asked Professor Moore, of Wisconsin, if he ever knew of a case of spontaneous combustion and he answered as follows:

"I do not know of a single case of spontaneous combustion that has occurred from storing alfalfa in barns."

Value of the Hay.

It might be asked what is the best use of alfalfa hay on the farm. My answer to that would be that there is not a single farm animal but will eat it with a relish and thrive upon it. It is the richest of all forage crops in protein, so it is fed by dairy men who feed scientifically for the largest milk production. It is the best of all hays for horses that have unusually hard work, and for growing colts it has no equal. For poultry, you are well aware of the demand for

ground alfalfa meal and how it is all brought into New England. I hope to see the day when we shall have alfalfa enough of our own and mills here in New England to grind it.

For hogs alfalfa is one of the best of feeds. In summer it is ideal to see the hogs feeding in the growing field and making gains at the lowest possible cost and then in the winter they are fed the dry hay in racks much the same as cattle.

For sheep as well as the other stock it is so much better than timothy that there is no comparison.

Our good old standard, timothy, that New England farmers have grown for generations is "hard hit" as a dairy feed or for growing stock when compared with alfalfa. I urge upon you the benefit to be derived from growing and feeding more of this legume.

Feeding Value.

If a field of alfalfa yields three cuttings per season for four years it has more than paid for its founding and then when it is plowed and taken into a cultivated crop we begin to realize as never before the full value of this wonderful plant. Records show that large yields have been obtained of corn and potatoes on an alfalfa sod. How can it be otherwise, with the ground filled with alfalfa roots to decay and form humus that is rich in nitrogen?

HORTICULTURAL PAPERS.

FLOWERS AND GARDENS OF JAPAN.

By Ernest H. Wilson, Jamaica Plain, Mass.

Delivered before the Society, with one hundred stereopticon illustrations, January 8, 1916.

One may safely assert that no garden large or small in the United States of America is without its something "japonica." True, not all the plants bearing that name are strictly native of Japan for the ignorance of botanists and others has resulted in many plant names being misnomers, but that is another story.

To the horticulturists of this country Japan is of peculiar interest for not only has it furnished our gardens and our greenhouses with a host of invaluable plants but it is the only country of which the first fruits, horticulturally speaking, came direct to the United States of America. The gardens of this country secured the plants of most lands through Europe and not only exotic plants but a great number of North American native plants also. With Japanese plants the case is different thanks to the enthusiasm of Dr. G. R. Hall. It is well that garden-lovers of this country should treasure the name of this gentleman for the plants he introduced — *Lonicera Halliana, Magnolia stellata, Malus Halliana* and others —. are indispensables. It was in March, 1862, that Dr. Hall returned from Japan and handed over his rich collection to Samuel Parsons at Flushing, Long Island, for propagation and distribution. But previous to this Francis Parkman of Jamaica Plain, Boston, had received a consignment of plants from Dr. Hall, through Mr. Gordon Dexter, and among others was the famous *Lilium auratum,* which flowered for the first time in America in July, 1862.

In the early 'sixties Thomas Hogg visited Japan in the interest of Samuel Parsons and introduced in 1865 many plants including *Magnolia obovata.*

Another American, Mr. W. S. Clark, who went from Amherst College, Mass., and developed the Agricultural College at Sapporo, in Hokkaido, in the early 'seventies of the last century, sent in

1876 seeds of many valuable plants such as *Magnolia kobus*, var. *borealis*, *Cercidiphyllum japonicum*, *Syringa japonica*, and *Actinidia polygama*. In the Arnold Arboretum and elsewhere many fine specimens raised from his seeds are growing today.

A few Japanese plants — *Rosa rugosa* for example — reached Europe toward the end of the eighteenth century, but it was not until after Commodore Perry's Expedition in 1852–'54, and the signing of the treaty on March 31st, 1854, which resulted in the opening of Japan to foreign commerce, that the plants of that land began to find their way freely to the Occident. A Russian expedition under Admiral Putiatin was in the Far East from 1852–55, and on January 21st, 1855, a treaty between Japan and Russia was signed. Shortly afterward treaties between Japan and other Western countries were signed.

From 1611 the Dutch East India Company had trading rights in Japan and established a factory on a small island contiguous to Nagasaki, and we owe our first knowledge of the flora of Japan to officers of this Company. From 1823 to 1830 Phillip Franz von Siebold was an officer in the Dutch company and resided in Japan, and from about 1850 to 1865 he imported plants to a nursery he established at Leiden in Holland. Among the most important of his introductions may be mentioned *Malus floribunda*, *M. Sieboldii*, *Wistaria floribunda*, var. *macrobotrys*, and *Prunus subhirtella*, var. *pendula*.

A Russian, Carl Maximowicz, who in 1854–1856 made very extensive collections in the Amur region of eastern Siberia, made a journey to Japan lasting from 1859 to 1864, which resulted in our first intimate knowledge of the forest flora of Japan and in the acquisition of a great many plants valuable to gardens, including *Berberis Thunbergii*.

Three Englishmen — John Gould Veitch from early spring to autumn of 1860; Robert Fortune from the autumn of 1860 to the summer of 1861; Charles Maries from 1877 to 1880 — collected extensively in Japan and each added to gardens treasures beyond price. During the same period, and in the early 'eighties various foreign amateurs in Japan sent to their friends in this country and in Europe such valuable plants as *Vitis Coignetiae*, *Prunus serrulata*, var. *sachalinensis*, *Rosa multiflora*, *R. Wichuraiana* and Rose "Crimson Rambler."

These historical facts are necessary to show that Japanese plants were independently introduced to this country and to Europe during the same period. The pioneer work briefly sketched above was supplemented in a remarkable manner by Professor Charles S. Sargent, Director of Arnold Arboretum, who visited Japan in 1892. His predecessors in Japan had enjoyed a virgin field but as an offset to this Sargent had the advantage which full knowledge of a subject gives. He knew not only the Japanese plants already in cultivation in the Occident but was also fully acquainted with the whole forest flora of Japan, and the result was that a great number of beautiful and hardy trees and shrubs were added to our gardens. He introduced among other plants, all the Japanese deciduous Oaks, certain Hornbeams, Birches, Alders, *Picea Glehnii, Abies sachalinensis, Malus zumi, M. Tschonoskii, M. Sargentii, Kalopanax ricinifolium, Enkianthus campanulatus, Acer nikoense, A. Miyabei, Rhododendron Kaempferi,* one of the most beautiful of all shrubs hardy in New England, and many other valuable plants. In fact, this journey was the most fruitful in results of any undertaken in Japan.

I have not the time at my disposal to enter further into this interesting aspect of my subject, but I cannot let pass this opportunity to put on record the names of those to whom all lovers of hardy Japanese plants are under lasting obligations.

Japan proper consists of four large and many hundreds of small islands and the country is much larger than many suppose. Its total length is about the same as this Atlantic seaboard from Nova Scotia to the southern end of the Florida Keys. Furthermore, the range of climate is much the same in both regions. A warm current sweeps up the east coast of Japan to near Yokohama where it is deflected out to sea and the result is that northward of this point the climate rapidly becomes colder. Geologically, Japan is made up of a broad backbone of volcanic mountains (many of the peaks of which are still active) narrowly flanked by sedimentary rocks, and here and there occur massive outcroppings of granite. There is very little limestone in Japan and this accounts for the wealth of Ericaceous plants which are a pronounced feature of the flora and occur in quantity from sea-level to the tops of many of the highest mountains. The whole face of the country is moun-

tainous and the scenery is for the most part pretty and picturesque. In the central parts of the main island (Hondo) are ranges of high mountains — volcanic and granitic — and the scenery there is bold and rugged. The sublime Fuji with its symmetrical cone, snow-capped for the greater part of the year, is 12,390 feet high and is the highest mountain in Japan.

Since the country is so broken a very considerable portion of it is not amenable to agriculture. The steep mountain-slopes are well covered with trees and shrubs and large areas are extensively forested. Also, and more especially in the central and northern parts of Hondo, there is much moorland clothed with coarse grasses and shrubs in variety. Coniferous, including Taxaceous trees abound from the extreme south to the extreme north, and, indeed, Japan with its sixteen genera of these plants is richer than any other land. From about the latitude of Tokyo southward the woods and forests contain a high percentage of broad-leaved evergreen trees and these together with the Conifers give to the country a very green appearance at all seasons of the year. North of Tokyo broad-leaved evergreens decrease in number rapidly and from Nikko northward the forests are very similar in aspect to those of New England. On the island of Yakushima, which marks the southern limits not only of Japan but also of its flora, Tree Ferns, Bananas, and Wild Figs are common constituents of the flora at sea-level. In the extreme north of Hokkaido and in Japanese Saghalien on the shores of the Okhotsk Sea, dwarf Pine, Juniper, Larch, and the Crowberry (*Empetrum nigrum*) descend to sea-level. Almost everywhere in Japan dwarf Bamboos form a dense undergrowth in the forests.

Some writers on the natural history of Japan have stated that the Straits of Tsugaru which separate northern Hondo and Hokkaido form a well-marked phyto-geographical boundary. This, however, is not true and the difference between the floras of the two regions is merely one of degree and not of kind. The warm current previously referred to, exercises a tremendous influence on the climate and on the vegetation and is responsible for the great difference between the floras of southern and northern Japan. Whilst no very hard and fast phyto-geographical line exists it may be laid down as about Lat. 36° N.

The flora of Japan is very rich in ornamental trees and shrubs and the majority of the deciduous plants and nearly all the Conifers have proved perfectly hardy and amenable to cultivation in the gardens of New England.

In Japan the Pine, the Bamboo, and the Plum-blossom (*Prunus mume*) are emblematic of long life, strength, and happiness, and a love of flowers is a dominant characteristic of the people. This love is spontaneous and fundamental and is one of the virtues of the race which appeals forcibly to the most casual visitor. The arrangement of flowers for house decoration is one of the three essential parts of every lady's education, and be it said it is an accomplishment in which the whole people excel in a manner most artistic. At no season of the year is any dwelling, be it peasant's hut or merchant's house, prince's castle or emperor's palace, without its flowers or sprig of fruit or foliage, and the graves of the departed are decked with floral decorations the year round. The Chrysanthemum is the chosen crest of the Imperial Household; three Asarum leaves found the crest of the first Shogun; one of the highest Imperial Orders is that of the Paulownia. The blossoming of the Cherry is made the occasion for a great national holiday. In the temple grounds are magnificent trees, and for old trees the love of the Japanese amounts to a veneration akin to worship.

Here and there throughout the land are places famous for their Plum trees, Cherry trees, Wistarias, Irises, Peonies, Azaleas, Maples, Chrysanthemums, Pines, Cryptomerias, and so forth, and in season people flock from far and near to feast on their beauty. These different floral seasons are kept as festivals of amity and rejoicing. Families in all their ramifications from great-grandmother to the youngest great-grandchild assemble together for a right merry time. In and near cities and where the sake-bowl flows too freely the merriment may be a little boisterous, but it is always the exuberance of good fellowship. When in Japan I found peculiar pleasure in the spirit of joyousness so manifest at these festivals.

With a few exceptions it is on trees and shrubs that the Japanese lavish their attentions. The Iris, Chrysanthemum, Lotus Lily, *Rhodea japonica, Liriope spicata,* and the Morning Glory are the only herbs that they are really fond of. The Morning Glory

(*Ipomoea rubro-caerulea*), an exotic of American origin, is extraordinarily popular and boasts societies whose object is the development of this particular flower. The blossoms open at sun-up and devotees will arise before dawn and walk long distances to gardens where this plant is grown to watch the flowers expand.

The floral seasons of Japan commence with the Ume or Plum-blossom (*Prunus mume*) in January, and close with the Chrysanthemum in November and December. In March and in April, according to climate, the Cherry trees blossom and this is the season *par excellence.* The Japanese recognize a hundred and more varieties of Cherries with white, yellow, pure pink to deep rose blossoms. Some are small shrubs, others large trees with wide-spreading crowns; some have pendent, others quite erect, branches, and all are wondrously beautiful. Cherry trees are wild in the woods and thickets throughout the length and breadth of Japan and are everywhere planted in vast numbers, in temple and castle grounds, in park and garden, in the streets of the cities and alongside the highways, and by pond and riverside. At Koganei, a village some ten miles from Tokyo, there is a three-mile avenue of Cherry trees planted in 1735, by command of the Shogun Yoshimune. Many of the trees are from sixty to seventy-five feet tall, with trunks from ten to twelve feet in girth and crowns from fifty to sixty feet through, and when in full flower the scene presented is a never-to-be-forgotten one. No language can exaggerate the beauty of the Japanese Cherries and they must be seen to be appreciated in full.

Now, there is no valid reason why here in Boston we should not have our own Cherry season, for the trees are perfectly hardy and thrive here. In the Arnold Arboretum the few large trees we have are a wealth of flowers each and every season. The Arnold Arboretum as one result of its recent expedition to Japan has now growing a collection of some seventy odd varieties of these Cherries and these will be propagated and distributed in due season. Unfortunately, in the Arboretum itself there is not sufficient spare land available to do full justice to this collection, but we hope that somewhere a proper home will be found for it.

The Wistaria, the most gorgeous of all hardy climbers, except in occasional years of severe winters, blossoms beautifully on house

and pergola in and around Boston, but I never knew the full glory of the Wistaria until I saw it in Japan. There it is not only wild in profusion but is abundantly planted by the sides of ponds, ditches, and streams, and it is trained over arbors and trellises. There are numerous varieties and on one I measured racemes of flowers sixty-four and a half inches long, and they were not mere individual examples but there were thousands upon thousands of them equally long!

About Wistaria time too the Moutan Peonies, the Iris, and the Azaleas make wonderful displays of color. Japanese Maples with colored leaves of various shape and form are well known in western lands but only a few of the varieties thrive with us. Japanese gardeners who specialize in Maples recognize over three hundred varieties, and Tokyo boasts its Maple Club, where everything from the tea-cups and the carved screens to the waiting-maids' dresses are marked with Maple leaves.

To mention in detail all the favorite garden plants would take up too much time and space but in addition to those already enumerated the following are to be found in gardens from Tokyo southward: Camellias, Bamboos, Hydrangeas, Box (*Buxus microphylla*), Black Pine (*Pinus Thunbergii*), White Pine (*P. parviflora*), Table Pine (*P. densiflora* var. *umbraculifera*), Umbrella Pine (*Sciadopitys verticillata*), Arborvitae (*Chamaecyparis obtusa*), *Ginkgo biloba, Illicium religiosum, Cryptomeria japonica, Cinnamomum Camphora, Podocarpus macrophylla, Trachycarpus excelsus, Chimonanthus fragrans, Magnolia denudata, M. liliflora, Pieris japonica, Fatsia japonica, Daphne odora, Nandina domestica, Pittosporum tobira, Ilex Sieboldii, Malus Halliana, Ternstroemia japonica, Enkianthus japonicus, Cycas revoluta, Chloranthus brachystachys,* Quince (*Cydonia lagenaria*), Weeping Willow (*S. babylonica*), Tea Plant (*Thea sinensis*), and *Physalis Franchetii.*

"The Japanese are true lovers of scenery; no people have a keener feeling for a beautiful landscape; to them a moon rising over Mount Fuji is a poem, and their pilgrimages to see Almonds in blossom or the glories of the autumn tints are almost proverbial, and yet, strange to say, in their gardens they seem to delight in setting at defiance every one of those canons which Nature has laid down so unmistakably for those who will be at the pains to read

them. The Japanese garden is a mere toy that might be the appanage of a doll's house. Everything is in miniature. There is a dwarf forest of stunted Pines, with a Liliputian waterfall running into a tiny pond full of giant gold fish — the only big things to be seen. There is a semblance in earth and stones of the great Mount Fuji, and in one corner is a temple to Inari Sama, the god who presides over farming and is waited upon by the foxes. Stone lanterns of grotesque shape spring up here and there, and the paths are made of great flat stepping-stones set well apart so as not to touch one another; shrubs, Cycads, and dwarf Conifers are planted, not without quaint skill and prettiness, but there are no broad effects, no inspiration of Nature. It is all spick and span, intensely artificial, a miracle of misplaced zeal and wasted labor. Attached to what were the Daimios' palaces in the old days there were some fine pleasure grounds, well laid out, rich in trees, and daintily kept. The gardens of the Mikado, by the shore of the bay of Yedo, are beautiful. But the average Japanese garden is such as I have described it, a mere whimsical toy, the relic of an art imported from China, and stereotyped on the willow pattern plate." So writes Lord Redesdale in his *Bamboo Garden*, and a more faithful picture could not be portrayed. Long familiar with these gardens in China I confess that I did not find them out of place in Japan. I have from experience become accustomed to regard them as belonging to the natural order of things appertaining to the Far East. But in the West, and in New England especially, they have no place. Let us cultivate in our gardens here all the beautiful plants that are hardy in this climate; let us inculcate that profound love of Nature so dominant in Japan; let us in our gardens take full advantage of natural beauty; let us import no exotic style of gardening, but strive to develop American gardens in harmony with American scenery and climate.

THE MISSOURI BOTANICAL GARDEN.

By Dr. George T. Moore, St Louis, Mo.

Delivered before the Society, with stereopticon illustrations, January 29, 1916.

The cultivation of plants for their healing qualities by the monks of the middle ages is generally supposed to have been the forerunner of the modern botanical garden, although these mediaeval gardens doubtless had their origin in others of greater antiquity. In a recent treatise on embroidery and lace by a Frenchman, the ingenious theory is advanced that the idea of a botanical garden originated during the sixteenth century in France, when the demand for flowers and fruits to serve as patterns for the designing of brocades caused the horticulturist, Gene Robin, to open a little garden, with conservatories in which he cultivated strange and little known varieties. This proved to be such a success that Henry IV. purchased the establishment and under the name of "The Garden of the King" it became crown property. In 1626 the learned Guy de Brosse suggested that medical students might study these plants without interfering with the designers of embroidery and tapestry. Hence the first Jardin des Plantes, with its natural history museum, came into existence. This institution served so many excellent purposes that other countries rapidly attempted to duplicate it — the author concluding with the naive statement, "Who would have thought it possible for embroidery thus to come to the aid of science?"

Unfortunately for this notion as to the origin of botanical gardens, the Jardin des Plantes was founded by Louis XIII. in 1610 and although the aesthetic study of plants and of flowers must undoubtedly have appealed to those who visited the garden, just as it does today, it seems quite certain that such collections of living plants were primarily brought together because of their real or supposed medicinal value.

The function of a botanical garden as an aid to scientific teaching

and research did not develop much, if at all, prior to the middle of the seventeenth century, when those at Bologna, Montpellier, Leiden, Paris, and Upsala became more or less noteworthy in this respect. The taste for ornamental and decorative plants had meanwhile slowly been gaining ground, as well as the desire to cultivate rare and unusual species. Many persons of wealth and influence, during the eighteenth century, became, through the employment of men skilled in botany and horticulture, generous patrons of science. The world was searched for new and rare plants which were brought to Europe for cultivation, and magnificent volumes describing these collections were published. The older gardens were essentially private institutions, but later many of the existing establishments, with an increasing number of new ones, were opened to the public, either without charge or for a small admission fee.

The modern botanical garden has a number of functions which did not appear simultaneously, but were a matter of gradual development. Beginning with the utilitarian idea, there were added the aesthetic, the scientific, and the educational, using these words in the broadest sense. Depending largely upon local conditions, these functions have been given different degrees of prominence, some gardens being essentially aesthetic, some mainly scientific, and others combining in about equal proportions all of the elements mentioned. Certainly the modern tendency is to make the botanical garden something more than a "museum of living plants" which, however necessary, is to a large degree uninteresting and lacking in its appeal to the public.

Most botanical gardens in this country are either connected with some institution of learning or maintained wholly or in part by the municipality. In this respect the Missouri Botanical Garden is unique, since it has no connection whatsoever with the city, paying taxes on all its revenue-producing property and only indirectly being associated with Washington University, through the graduate school of botany.

The garden as it now exists is the development of the private garden of Mr. Henry Shaw, who came to this country from England in 1818 and soon after settled in St. Louis. Acquiring a fortune within about twenty years, Mr. Shaw devoted the larger part of the remaining fifty years of his life to the enlargement and manage-

ment of this garden, which, although freely opened to the public, remained his private property until his death. Seeking the advice of such men as Dr. George Engelmann, Sir William and Sir Joseph Hooker, and Professor Asa Gray, Mr. Shaw, in a will, remarkable for its breadth and farsightedness, left to a self-perpetuating board of trustees the administration of his property and, through a director, the management of the garden which he himself designated as the Missouri Botanical Garden.

It may truly be said that practically all the various aspects of the work of this garden at the present time, whether they be scientific, educational, or aesthetic, were conceived by Mr. Shaw and provided for in a very definite manner by his will. As funds have become available, various aspects of the work have been enlarged and it is possible that in some respects the development has proceeded further than Mr. Shaw imagined possible, but the germ of the idea may be found in his will and had he lived to the present time it seems more than likely that his own management would have produced practically the institution as it now exists.

The garden comprises about one hundred and twenty-five acres in the heart of the city, about sixty acres of which are as yet unimproved. It is in no sense a part of the park system, being enclosed within a stone wall or fence, and pleasure vehicles are not admitted. In addition to the ordinary landscape treatment of such a garden, including the usual plantations of trees, hardy shrubs, and flower beds, there are also special outdoor collections comprising such features as the so-called "North American tract" in which are included a systematic arrangement of a considerable number of plants hardy in the vicinity of St. Louis; a small arboretum; a medicinal garden; a large Italian garden, laid out on strictly formal lines; a so-called "Linnean garden," which takes its name from one of the older greenhouses, called by Mr. Shaw the "Linnean house," and which because it is bounded on three sides by a wall, is patterned after some of the English gardens; a rose garden; an economic garden, in which are displayed special collections of useful plants, such as rice, peanuts, tobacco, sugar cane, cotton, farm crops of various sorts; examples of vines, hedge plants, annuals and perennials suitable for growing in the vicinity of St. Louis; bee plants, herbs, small fruits, and anything which can

serve as a demonstration to the public of what may be accomplished in the growing of useful and ornamental plants. Four sample back yards of varying size and treatment are included, and plans for the future contemplate the addition of various other features for which there seems to be a demand.

Within the last three years about 100,000 square feet of display greenhouses have been added, within which are maintained permanent collections of palms, economic plants, ferns, desert plants, cycads, orchids, etc. There is a floral display-house, 200 x 50 feet, where a continuous flower show is maintained from October to July. This house is admirably adapted for the purpose and probably nowhere else in the country does the public have an opportunity for seeing such an exhibition of blooming plants. Next spring this house is to be devoted to a typical Shakspearean garden with beds, hedges, trellises, fountains, garden furniture, and plants mentioned by Shakspeare, and will duplicate as nearly as possible the Elizabethan garden of three hundred years ago.

In addition to the outdoor and indoor collections of plants, the garden maintains one of the best botanical libraries and herbariums in the United States, and these two features serve as most important adjuncts to the Shaw School of Botany which, with adequate laboratory facilities, devotes its principal endeavor to the training of graduate students in botany, these students receiving their master's or doctor's degree from Washington University. This school, although largely maintained by the funds of the garden, is a department of Washington University. A small experimental greenhouse, just completed near the laboratory, provides the necessary working space for the graduate students. Under this greenhouse there are cellars, devoted to the experimental side of mushroom growing, as well as a large pit in which investigations concerned with the rotting and destruction of timber are carried on.

The small museum and library building, erected by Mr. Shaw, is now devoted to a remarkably fine collection of specimens illustrating the diseases of wood, and from time to time special exhibitions of special interest are shown here.

In addition to the graduate students, a school for gardeners is maintained, which, because of the unique opportunities available, and the special character of the work, is perhaps not to be equaled

elsewhere in this country. Young men and women who have received a high school training or its equivalent are admitted on examination and devote three years, of twelve months each, to the practical and theoretical aspects of landscape designing, floriculture, horticulture, engineering, etc. The courses include such subjects as diseases of plants, entomology, soils, mechanical and freehand drawing, plant breeding, general and systematic botany, as well as the various more strictly horticultural subjects. The morning of each day is spent in practical work, both indoors and out, and by the end of the third year the student has had an opportunity to become personally acquainted with the definite growing methods and management of such groups of greenhouse plants as orchids, palms, tropical economic plants, desert plants, etc., as well as the actual propagation, growing and care of practically every sort of plant which can be grown out of doors in St. Louis.

While the plan and conduct of such a garden is essentially scientific, differing from most private estates or parks, the public apparently appreciates the efforts being made, since the attendance is constantly increasing. It has been amply demonstrated that a garden of this character will furnish recreation and pleasure to thousands who are not seeking merely for amusement, and every effort is made to have the collections, in so far as possible, informational if not instructive. Naturally, such a place must be attractive and the mere accumulation of numbers of botanical species, crowded together, will not answer the purpose. By maintaining floral displays of plants which are either little known, or because of the wealth of bloom and color cannot be seen elsewhere, and by showing rare tropical plants which, because of their fruit or use in commerce, are known to the average individual, as well as the commoner things which are frequently read about but seldom seen, the garden is able to make a definite appeal to many. Such an institution, with the various enterprises referred to, is naturally expensive to maintain and it is impossible to do all in any one department that might be desirable. However, it is believed that the income will eventually be sufficient to support the various projects now under way and that ultimately the Missouri Botanical Garden will become an even greater monument to the greatest patron of botany and horticulture that this country has ever known.

THE DEVELOPMENT OF FRUITS FOR SPECIAL CONDITIONS.

By W. T. Macoun, Ottawa, Canada.

Delivered before the Society, February 12, 1916.

It is only during comparatively recent years that much attention has been given in America to the relative suitability of the many kinds and varieties of fruits to different parts of the country. This is largely due to the fact that it is not so many years ago since there was comparatively little fruit grown, except that which was produced in the Eastern States and Eastern Canada where the differences in climate were not so striking as they are between the Eastern and Western States, and between the middle West, and the East and West. When, however, the middle West, and the West, began to produce such enormous quantities of fruit, large quantities of which reached the Eastern markets, attention was called to the fact that some varieties of fruit looked and, some will say, tasted quite differently from the same varieties grown in the East.

Certain sorts were found particularly suited to the climatic conditions of the West, while others did not succeed so well. On investigation, or when we really came to think seriously about it, marked differences were found in the relative success obtained with varieties in different parts of the East, some sorts doing much better than others in a certain section of the country, while in another place they did not do so well. Now the adaptation of varieties to soil and climate is receiving a great deal of attention.

Perhaps another reason why more study had not been given to the adaptability of varieties until recently is that there are such great areas in North America where the growing and ripening season is very favorable to fruit culture and many sorts that will withstand the winter climates succeed over a wide range, as they get sufficient heat, sunlight, and moisture for the fruit to develop well. How different this is to Great Britain and certain parts of

Europe where some kinds and varieties of fruits are grown with great difficulty and where special methods of culture and training have to be adopted to get the fruit to mature, and where adaptability has been a serious question with the people for many years.

Many English gardens are surrounded by high walls not only for the sake of privacy, but to obtain the climatic conditions which the owner desires to get. To show how important these walls are and the exposures necessary for different kinds of fruits, I quote the following from an English book known as "The Gardener's Assistant" (Thompson).

"The southern aspect (he writes) being the most important requires to be taken first into consideration. It may according to circumstances face either directly south or it may be inclined to the south-east to face the sun about eleven A. M., or it may incline to the south-west to face the sun about one P. M. In parts of the Kingdom where the climate is sufficient to ripen peaches and nectarines perfectly, on a wall facing the sun at eleven A. M., that aspect should be chosen, as in that case the adjoining walls can proceed at right angles and afford two good western aspects on which the sun may commence to shine as early as eleven A. M., so that apricots, plums, cherries, and the finest sorts of pears could be ripened to perfection upon it. But if the heat against an aspect, thus inclined an hour to the east of the meridian, is not sufficiently intense to ripen peaches satisfactorily, the aspect must face the sun at noon and, where the climate is still colder, it will be advisable to turn the aspect directly to the sun at one P. M. The eastern aspect is recommended for summer and early autumn fruits, for, owing to the ripening period of these being nearly that at which the hottest weather occurs, an indifferent aspect will ripen them tolerably well." This attention to aspects where a greater or less amount of heat is obtained is based on temperature records which the author describes in these words. "Moreover, the average force of the sun's rays in the three hours before twelve noon is, according to these observations about 44° Fahrenheit and in the three hours after twelve it is 62° Fahr. From this it is evident that a wall with a west aspect must be much warmer than one with an east aspect. The sun shines on a clear day as long on the one as on the other but not with equal intensity. For three

hours before noon the sun shines on the east aspect at the same mean angle as he does on the west aspect for three hours after noon; but during the latter period his rays have according to the above observations about 40 per cent greater intensity."

The results which the English gardener obtains with fruits under what some of us might consider rather trying climatic conditions is remarkable.

The importance of the local climate in growing fruits successfully or otherwise was well brought out in an article on "Climatic Adaptation of Apple Varieties" by Dr. J. K. Shaw of the Massachusetts Agricultural Experiment Station at Amherst in the 23rd annual report of that Station from which the following is a quotation:—

"There is a close relation between the mean summer temperature and the development of the fruit. For every variety there can be determined a mean summer temperature at which it reaches its highest and most satisfactory development. Any departure from this mean results in greater or less inferiority of the fruit, the degree of inferiority depending on the amount of the departure and the variety. A summer mean too low for a variety results in (1) greater acidity, (2) increased insoluble solids, (3) greater astringency, (4) less coloration, (5) decreased size, (6) scalding in storage.

"A summer mean too high for a variety results in (1) uneven ripening, (2) premature dropping, (3) rotting on the trees, (4) poor keeping quality, (5) lack of flavor, (6) mealiness, (7) less intense color, (8) decreased size."

Color in Apples.

The cause of high color in apples is not thoroughly understood, but it may be said that each variety of apple has a color or a possibility of a color or colors peculiar to itself and it requires the proper conditions and chemical changes to develop them and make them apparent to the eye. Certain conditions will intensify the color of a variety, and others will lessen it. Some of the principal apparent causes of the development of color in fruit may be considered. It is well known how important a factor sunlight is in the development of color in fruit.

Fruit that is hidden by foliage is not as well colored as that exposed to full sunlight, hence the importance of thoroughly pruning and thinning. During the past few years it has become quite an amusement to cover part of an apple early in the season with a letter or letters or the profile of some person. Underneath these letters or profile the right color does not develop and when they are removed the letters stand out in green and yellow in the surrounding red, to the wonder of the uninitiated, thus showing that sunlight is necessary for the development of high color. Heat is also an important factor in determining intensity of color. Each kind of fruit appears to have its optimum or best mean temperature in the growing season. In countries or districts with cool summers for the kind of fruit in question the fruit is not as a rule highly colored and where the summer temperature is very high some varieties of apples are not as well colored as where the summers are a little cooler. Fruit on young trees growing vigorously and causing the fruit to grow late is not well colored. This leads to the conclusion that the degree of maturity of the fruit has much to do with the color.

In Ontario late keeping varieties have the best color in the warmer districts where the fruit becomes most mature before picking. Early varieties or those that mature in summer or early in the autumn get sufficient heat in most places in Canada where apples are grown to reach their full development in comparatively warm weather, hence are highly colored over a much wider area than are the late winter varieties which, where the season is relatively short and the autumn cool, do not reach their best condition. In warm, dry seasons fruit matures earlier than in seasons which are less so, and if well developed the more mature the fruit is before it is harvested the higher the color will be. The fruit in the dry districts of British Columbia, Oregon, Washington, California, and some other States is noted for its high color. There the trees are irrigated and by stopping irrigation and causing a ripening of the wood of the tree and a thorough maturing of the fruit the latter becomes highly colored.

In orchards where the trees are in the sod, winter apples are usually more highly colored though smaller than in cultivated orchards, evidently because the trees ripen sooner and the fruit

matures more quickly than in cultivated grounds. This leads to the conclusion that moisture must play an important part in the coloring of fruit, as the relative amount of moisture and heat will determine to a large extent when the tree stops growing and when the fruit will mature. British Columbia, Oregon, Washington and other places where irrigation is practiced afford the best combinations of sunlight, heat, dryness, and moisture, hence it is that some of the most highly colored fruit is produced there. What part, then, do soils or plant food in soils play in the production of highly colored fruit? This is a question in which every fruit grower is interested. From the foregoing statement it can easily be seen that warm, well-drained soils are most likely to produce apples of high color, as on these soils the tree and fruit will mature earlier than on wetter soils.

Local Climatic Influences.

Some horticulturists have already made lists of apples showing the number of heat units required during the growing season to bring the different varieties of apples to their full development; these lists being based on the heat units during the growing season where these varieties are succeeding best. These lists are valuable guides to intending planters. In our experience at Ottawa it has been found that the maximum temperatures, at least with the grape, are as important as the mean temperature or the total number of heat units. Unless certain maximum temperatures are reached the variety does not ripen. Some grapes will not ripen if there is a cool September and October, while others will ripen every year. Those which ripen in the coolest seasons with us are Early Daisy, Manito, Champion, Jewel, Moyer, Winchell or Green Mountain, Dracut Amber, and Peabody. As many as 118 varieties of grapes have ripened with us in a warm season and it is interesting to find that the relative time of ripening varies according to the season. In a warm season certain varieties will ripen earlier than others that will in a cool season mature first. The Vergennes, one of the latest sorts to ripen in the best grape districts, does not require high temperatures in which to mature and ripens even in a rela-

tively cool season at Ottawa. The Concord, on the other hand, rarely ripens there.

Sufficient has probably now been said to show the important relation of the local climate to the kinds and varieties of fruits which will succeed best and the importance of growing those that reach their highest development under certain climatic conditions.

Originating Hardy Varieties.

What is being done to obtain other sorts more suited to the many climates found in North America? I shall in this paper do little more than describe some of the work which is being carried on in Canada, as it is with this that I am most familiar, but busy workers are engaged on problems more or less similar in the various States in this country.

Although the McIntosh and Fameuse apples are well-known fruits and both natives of Canada, the number of varieties of fruits of Canadian origin grown commercially in Canada is very limited. Up to the time when the Experimental Farms were established in 1886 there were few persons that were interested in originating new fruits and even today the number interested is very limited. Canadians have had to depend for their fruits of all kinds mainly on other countries, the United States having contributed the largest number, but even in the United States little systematic effort has been made to originate fruits until recent years, most of those now on the market being chance seedlings the merits of which have been discovered.

Let us now see what has been done and is being done by systematic work in Canada and the United States in the development of fruits for special conditions, and as I am more familiar with our own work than any other the results of it will be given in some detail to show what can be accomplished; and as the largest part of the work has been with the apple this fruit will be dealt with first.

In Canada there are many climates varying from the extremely mild one of the West coast and Vancouver Island to the extremely cold one of the north and central parts where the temperature in winter frequently falls to between 50° and 60° below zero. There

are great differences of climate in summer also, it varying from the extremely dry warm summers of the Okanagan and other Valleys of British Columbia to the cool, moist, summer climate of Prince Edward Island where the winters are rather severe and the cool, moist, summer climate of the Lower Mainland of British Columbia where the winters are mild. It is our desire to obtain fruits specially suited to each of the many climates in the Dominion.

As the need for hardy varieties for the prairie provinces was and still is very great, there being no known apples of good size that will succeed without protection all over the prairies, an early attempt was made to obtain some suitable for such conditions. The Wild Siberian crab apple, *Pyrus baccata,* which is found wild nearly or quite to the Arctic Circle in Siberia, seed of which was imported from the Royal Botanic Gardens, Petrograd, Russia, in 1887 was, on being tested, found to be quite hardy on the open prairies, but the fruit was very small, being only about half an inch or less in diameter and very astringent. The late Dr. Wm. Saunders began crossing this crab apple with named varieties of apples in 1894 the varieties used being such hardy sorts as Tetofsky, Duchess, Wealthy, McIntosh, Yellow Transparent, and others. He obtained about 800 cross-bred trees as a result of this work, and these began to fruit in 1899. Much the largest proportion of these bore fruit little if any better than the mother parent, but a considerable number showed a marked advance in size and quality. The best were from twelve to fourteen times heavier than the fruit of *Pyrus baccata.* The largest fruits, however, were under two inches in diameter. Those best in quality have little or no astringency and compare well in quality with the well-known crab apples. They have proven hardier than the latter, however. So hardy are some of them that in latitude 58° in the Peace River Country, where the temperature frequently goes down between 50° and 60° Fahr. below zero, fruit has been grown. The fruit of nearly all of these has the marked crab apple characteristics of long, slender stem, thin tender skin, and crisp breaking flesh. The names given to some of these are Charles, Jewel, Silvia, Elsa, and Tony. A large number of trees of these crab apples were sent out to settlers in the prairie provinces between 1903 and 1906, and in many reports recently received the people have expressed their appreciation of these hardy fruits.

None of the varieties from this first crossing were large enough to compare favorably with good sized apples. The best of these first crosses were, in 1904, crossed with the apple again. In this work some of the same parents used in the first crossing, such as Duchess, McIntosh, and Yellow Transparent were again used and over 400 trees were obtained. Of these 24 have borne apples two inches and more in diameter, some of the largest being $2\frac{1}{2}$ inches. Most of these second crosses retain the long slender stem, the thin tender skin and the breaking flesh which are characteristic of *Pyrus baccata*. These are now being tested for hardiness on the prairies, but it is too soon yet to reach conclusions, but the foundation has been laid for a new race of apples specially suited to prairie conditions.

Work in developing apples for the Canadian prairies is going on in another direction. A few of the hardiest Russian apples are succeeding in favored parts of the prairies, and to obtain, if possible, other and better varieties which will succeed even under the severest test, many thousand seedling trees of the hardiest Russian varieties are set out as yearlings in nursery rows and exposed to the severe weather. Many of these trees though still young and not yet in bearing have gone through from two to three winters without material injury and it is expected that at least a few hardy, good sorts will be obtained in this way.

There are, however, no perfect varieties of apples available even for those milder parts of Canada where apples are grown in large quantities, there being one or more weak points in them all. An endeavor has, therefore, been made to obtain other and better apples covering the whole season from early summer to late winter, and the results so far have been very gratifying, though there is much yet to be done.

Seed was sown at Ottawa in 1898 of such well-known varieties as Northern Spy, McIntosh, Wealthy, Fameuse, American Golden Russet, Shiawassee, Gano, and others. From the trees grown from this seed, detailed descriptions have been made of over 1211 varieties which have fruited. Descriptions were made of good, poor, and indifferent seedlings, the object being to get some data which would show the proportion of characters of the mother tree which were reproduced to at least some extent in the seedlings.

Before beginning this work it was expected that a large proportion of the seedlings would prove to be crab apples, but quite the contrary is the case. Of 1211 seedlings taken as they came only 3.95 per cent are small or crab-like. There are 12.75 per cent which are below medium in size and are not considered of marketable size, but the remaining 83.30 per cent bear medium to large fruit. It has been found that in most varieties many of the characteristics of the mother parent come out quite strongly.

Out of the 1211 varieties there were 378 which seemed sufficiently promising for some part of Canada that they were propagated to save the variety, and out of this number 99 were considered so promising that they were named.

Let us now analyse the seedlings of a few well-known apples beginning with the McIntosh which, though an apple of Canadian origin, is well known in Massachusetts.

The McIntosh is a highly colored red apple above medium in size, briskly subacid and of very good flavor and quality. Its season at Ottawa is from November to February or March. Of 120 seedlings described 65.83 per cent were highly colored red or crimson apples; 76.67 per cent were medium to large in size; and 23.33 per cent were below marketable size, being a larger proportion than from most parents; 19.16 per cent were sweet apples; 4.18 per cent mildly subacid; 60.00 per cent subacid; 15.83 per cent briskly subacid and .83 per cent acid. As regards quality only 11.66 per cent were medium or inferior in quality; 41.67 per cent were above medium or pretty good eating apples; and 46.67 per cent were good to very good in quality or really good dessert apples. The season of 1.67 per cent was August to mid-September; of 18.33 per cent mid-September to mid-October; of 28.33 per cent October and November; of 34.17 per cent November to February or about the same season as McIntosh; and 17.5 per cent were in season from December to March or April. Some of these seedlings have a strong resemblance to McIntosh in color and flavor, but are of different season. Three of the best of these are Melba, an August apple; Joyce, a September apple; and Pedro, an October apple. Of 120 McIntosh seedlings, 19 have been named.

The Northern Spy is well known as a well-colored winter apple of very good quality. Of 136 seedlings which fruited only 12.5

per cent were below marketable size. The predominating color of 72.79 per cent was crimson and red. Of sweet apples there were 6.62 per cent; mildly subacid 5.15 per cent; subacid 60.29 per cent; briskly subacid 25.00 per cent; and acid 2.94 per cent. There were 23.53 per cent of medium or inferior quality; 50 per cent above medium and 26.47 per cent of good to very good quality. In regard to season, only .74 per cent was in season from mid-August to September; 14.70 per cent from mid-September to mid-October; 38.23 per cent October and November; 27.21 per cent November to February; and 19.12 per cent December to March or April. Here again we have apples of the Northern Spy flavor in season from fall to late winter, such as Thurso, an October apple; Rocket, a November apple; Donald, a December apple; and Niobe and Elmer, winter apples; and other good sorts. Of 136 Northern Spy seedlings 22 have been named.

Just one more example to show the results from a variety of medium or inferior quality; the Gano, which is very similar to Ben Davis except that it is more highly colored. There were 83 seedlings of Gano described. Of these 68.67 per cent were medium or inferior quality; and 31.33 per cent above medium; and not a single variety of the 83 was good in quality as compared with 46.67 per cent McIntosh of good quality and 26.47 per cent Northern Spy. There was a high percentage, however, of late keeping apples, 49.40 per cent, the Gano being a good keeper. These examples of the seedlings from three mother parents will give a good idea of the results obtained. With this lot of 1211 seedlings the male parents were unknown. When the seed was taken it was believed that in an orchard containing several hundred varieties there would be many combinations which would not be brought about by hand pollination and the results have been more satisfactory than was hoped.

Ever since 1899, hand pollination or artificial cross-breeding has been carried on and a number of the trees resulting from this have now fruited and a few good varieties have been obtained, and it has been shown that certain characters of both the individual parents can be obtained in the cross and so far the influence of the mother parent and male parent seem to be about equal if reciprocal crosses are made. Several hundred trees from this hand pollination have

yet to fruit. So far the one fact that has come out most prominently is that if one desires to obtain a seedling of high quality, it is desirable to use two varieties with high quality. If one is high quality and the other low the resulting cross will not, as a rule, be high enough in quality.

I could spend more time in describing the results of our work with apples, but time will not permit. In the United States there are a number of workers endeavoring to obtain apples specially suited to the climatic conditions of their particular parts of the country. At the Agricultural Station at Geneva, New York, they are working to obtain winter apples of high quality. In Missouri combinations between Ben Davis and Jonathan have been obtained and it is hoped some of these will be particularly suited to the climatic conditions there. In Iowa they are seeking for apples which will bloom late in the spring and thus escape the spring frosts which are often so injurious there. Thus each one is trying to solve his own problem and develop apples for his special conditions.

It will not be possible to discuss the other fruits in such great detail as the apple and not so much work has been done in Canada with other fruits.

Hardy Plums.

The plum offers a fine field for work. In Canada our greatest effort so far is to obtain hardy varieties which will succeed in places where few, if any, named ones have done well. Not only is it necessary to obtain varieties which will be able to withstand the cold of winter, but in many parts of the country extreme earliness is necessary to ensure their maturing before the severe frosts of autumn. At Ottawa the season is long enough to mature most sorts of plums, but the winters are too severe for the trees. The trees of some varieties of the European plums are hardy enough but the fruit buds are destroyed, hence for satisfactory results we have had to rely on the improved American plums.

The European or Domestica plum may be crossed with something hardier that will ensure hardy trees and good crops of fruit, but seedlings of it do not show sufficient hardiness. If the American plum could be crossed with the European, no doubt some very

desirable plums would be obtained but, so far as we are aware, this has not been done successfully. The Japanese Plum, *Prunus triflora,* will, however, cross with the American and one of the most useful plums now growing at Ottawa is the Omaha a hybrid originated in Nebraska. The flower buds are hardy and the fruit ripens early and combines the qualities of the Japanese and American. No doubt, there will be many useful plums for the colder districts originated as a result of crossing these two species. A few have been originated at Ottawa already.

The Canada plum, *Prunus nigra,* which grows mainly in eastern Canada and the north-eastern states is a more promising species to work with than the common species of the Middle West *Prunus americana.* The latter has, as a rule, a very thick skin while the former has a thin skin and is better for canning and preserving on this account than *Prunus americana,* although the latter is, as a rule, better in quality. The tree of *Prunus nigra* is much tougher than *P. americana* and does not break down from snow and ice in the winter the way *P. americana* does. Some of the earliest plums such as Cheney and Aitkin are varieties of the Canada plum. The fruit of local sorts of *Prunus nigra* is ripe early in August at Ottawa and a few growers are finding them very profitable to grow as they come on the market before the Domestica or European plums from any part of Canada. The only plums they come in competition with there being those from California, of which few are used for canning or preserving. It is believed that there is an excellent opportunity for improving this native plum and obtaining better varieties especially suited for the colder parts of Canada and the United States. The Minnesota Fruit Breeding Station is paying especial attention to the improvement of American plums as in Minnesota, Wisconsin, and the Dakotas this type of plum is particularly valuable.

Some of Luther Burbank's best productions are his plums which, although they do not seem to have a very wide adaptation, are particularly suitable for California and some of the other Western States.

Hardy Pears.

The pear is a fruit of which there is still an opportunity of developing varieties for special conditions. At Ottawa the only ones which have proved hardy and blight resistant are Russian sorts, such as Kurskaya and Zucherbirn, but they are so inferior in quality that they cannot be regarded as of much value in themselves, but these have been crossed with some of the best sorts of pears in the hope of obtaining good, hardy, blight resistant varieties. The trees are young yet, but something good is hoped for. New York State is also experimenting to procure blight resistant varieties, but the State of Oregon has, no doubt, the largest experiment under way. There they have got together a very large collection of varieties of pears and by inoculation with the germs of fire blight have found a few that are immune. It is hoped that in crosses of these and the best pears will be obtained varieties especially suited to those districts where fire blight causes much loss.

Hardy Cherries.

In Oregon, also, attention is being paid to the breeding of cherries, especially suited to Western conditions. The Bing, a sweet cherry which originated there some time ago, is one of the most profitable cherries for that part of America. At Ottawa seedlings have been grown of hardy Russian varieties, but none have proved sufficiently hardy in flower bud as even the hardiest of the Russian cherries only bear a crop occasionally, though the trees are quite hardy. Some species, however, may be discovered which is extremely hardy in flower bud which on being crossed with these Russian sorts will give something of value. A hardy bush cherry procured from the Arnold Arboretum some years ago, *Prunus tomentosa,* a native of North-eastern Asia is being used as a basis for new cherries at Ottawa, but has not been successfully crossed with the sour cherry.

Hardy Peaches.

Doubtless there are a number of workers in the United States trying to obtain peaches suitable for special conditions. Better shipping varieties are needed, peaches that are of high quality. In Canada the Experimental Station at Vineland is paying especial attention to the peach and is endeavoring to obtain varieties which will be better for special purposes than any of those already on the market.

Hardy Grapes.

There is a vast field for work with the grape. Rogers accomplished a great deal with very little labor, but years elapsed before very much was done by others to supplement it. The late T. V. Munson of Texas did a great work in combining the qualities of different species of grapes, and left some very fine varieties as the results of his labors. Some of his grapes are specially suited for Southern conditions, but his Manito, a very early grape, is proving useful as far North as Ottawa. Grapes above all fruits are much affected by a few degrees' difference in temperature, by the relative dryness of the air, and amount of sunshine. There are grapes which succeed in California which are of no value in the East, and grapes grown in Massachusetts that are of no value in the colder parts of Canada. New York State is breeding grapes for the East, and doubtless other States as well, and we may look to see the varieties grown at present gradually changed for something better. Some work is also being done in Canada. Large numbers of seedlings of Rogers hybrids are being grown there in the endeavor to obtain better sorts. The frost grape, *Vitis riparia*, grows as far North as Manitoba and offers a hardy parent. Some decided improvements were made on this years ago in Canada in the varieties Brant and Canada, two sorts which ripen in the coolest seasons at Ottawa and it is in procuring more and better grapes which will mature in comparatively cool weather that the opportunity of the plant breeder lies.

Hardy Blackberries.

The blackberry is a delicious fruit, but little has so far been done so far as we are aware in developing varieties for special conditions. The wild species of this fruit does not extend as far North as those of the raspberry, currant, gooseberry, and strawberry, and the cultivated blackberries that we have did not come from the most Northern types with the result that none of these are perfectly hardy at Ottawa and in many other parts of Canada and the colder parts of the United States. Quite recently we have collected wild plants in the neighborhood of Ottawa where the blackberry is near its Northern limit with the purpose of crossing these with the hardiest of the named varieties. There should be such fine varieties as Kitatinny and finer, that would be perfectly hardy as far North as the wild types extend.

Hardy Raspberries.

The wild red raspberry extends as far North as the Arctic Circle in Canada and yet little has yet been done to obtain raspberries as good as Cuthbert which will be quite hardy without protection everywhere where the wild one succeeds. The Cuthbert has a very wide adaptation in the more temperate parts of the United States and Canada, but who will say that better varieties will not be obtained which will be more adapted to special conditions. The Brighton and Count are two early raspberries originated at Ottawa which are among the hardiest tested there and the Herbert originated as a chance seedling with Mr. R. B. Whyte of Ottawa is the best main crop variety for that climate. Here again the local sorts seem more adapted than any others which have been tried. Prof. Hansen of the South Dakota Experiment Station has selected the Sunbeam out of a large number of wild seedlings as being especially suited to prairie conditions, while on the Western Coast the Loganberry, a hybrid between the raspberry and blackberry, originating out there, succeeds much better than in the East.

Hardy Gooseberries.

How little has been done to obtain gooseberries adapted to special conditions. In most places in America the English gooseberries mildew badly and it would be a fine thing if there were varieties originated which would be immune to this disease, no matter how adverse the conditions were. Such reliable American varieties, or hybrid gooseberries, as we have were originated some time ago. The Downing, and a Canadian variety very much like it, the Pearl, among green gooseberries, and the Josselyn or Red Jacket another Canadian gooseberry among red skinned varieties, are among the best for the East, but these do not succeed under cold prairie conditions, the old Houghton being found much hardier. In the Western States the Oregon Champion is the popular sort. Not only must varieties be immune from mildew but they must be able to withstand the heat of the sun in other districts and not scald as some gooseberries do today in certain places.

Hardy Currants.

The red currant is not so important a fruit in the East as it is on the plains to the West and North where its great hardiness makes it one of the most valuable fruits. The large fruited varieties of the Fay and Cherry types at present on the market are much tenderer than the smaller ones of the Red Dutch and Raby Castle types. The former were evidently derived from stock of the red currant from near its southern range in Europe and indeed the Cherry currant probably originated in Italy. It was introduced thence into France and fruited there in 1843 and was subsequently brought to America. Fay originated in 1868 with Lincoln Fay, Chautauqua Co., N. Y., and was introduced about 1883. It is probably a seedling of the Cherry. These varieties, although among the largest fruiting sorts, are not quite hardy at Ottawa and the crop from them is small. Considering the difference in size between these large fruited currants and the Red Dutch there is great room for the development of larger fruited hardy sorts especially suited to cold climates. The quality of currants could also be much

improved if acidity of some sorts were moderated and by obtaining varieties of better flavor. The Moore's Ruby is not so acid as most varieties nor are some of the white sorts as acid as the red. There seems to be no good reason why the size of the currant should not be much increased, but very little work seems to be being done in breeding better currants, certainly little has been done in Canada.

Black currants are very popular in some parts of America and are particularly popular in certain sections of Canada, and at Ottawa are much more profitable to grow than the red. They are used for jam and jelly and are said to be very useful in moderating colds. Comparatively little seems yet to have been done in developing new varieties of this fruit, although the Boskoop Giant, one of those most recently introduced, is a long way ahead of the old Lees Prolific and Black Champion both in size and quality. When such a marked advance has been made there seems good ground for believing that further advances are yet to follow. Larger fruits and larger bunches may be looked for and the flavor which in the best varieties is very agreeable to many people will, no doubt, be much more refined. The wild American species of black currants, *Ribes floridum* and *Ribes hudsonianum,* extend into very cold parts of Canada and hybrids between them and the cultivated varieties of *Ribes nigrum* may result in combinations which will be very desirable. The black currant was a very popular fruit with the late Dr. Wm. Saunders at Ottawa and as a result of his labors we have a number of very hardy and productive black currants of good quality that are proving very acceptable in the colder parts of Canada.

Hardy Strawberries.

And now we come to the last fruit which will be referred to in this paper, the strawberry, the most popular fruit of all. Everyone, we think, will admit after tasting the Marshall and Wm. Belt strawberries that most of the other varieties of which there are several hundred are far below the standard of these fine sorts and the best English varieties. Most of the more productive strawberries in America are inferior in quality. They are too acid and

are lacking in flavor. The Marshall is a poor plant maker, is not very productive, as a rule, is tender, and the Wm. Belt, at least with us, is not sufficiently productive. There are, of course, a few other varieties as good in quality perhaps, as these but they are lacking in something. In parts of America where the climate is hot and dry deeper rooted sorts are needed that will withstand such conditions. In parts where the climate is wet, firm sorts of good quality are desired that will withstand heavy rains. In places where there is little snow in winter but great cold, varieties are needed that will withstand extreme cold. Where the fruiting season is often dry, moderate plant makers are desirable as most of the heavy plant makers seem to suffer most in dry weather.

Certain varieties at present on the market are known to succeed better in some places than others. The Magoon, which is so popular in the Western States, does not do particularly well in the East. The Senator Dunlap has, perhaps, as wide an adaptation as any variety, but it is a heavy plant maker and does best, at least in Canada, where the season is relatively moist. There are a number of persons breeding strawberries for special conditions. Several private individuals have developed some good sorts. The New York Agricultural Experiment Station has originated some. Mr. Georgesson of the Alaska Station has for a number of years been breeding strawberries especially suited for the North-west Coast by crossing the native species with the cultivated varieties and some good sorts have been obtained especially suited for the conditions there. Great development has taken place in the autumn bearing strawberries largely through the work of one man, the Progressive variety being a great advance on the Pan American, for instance. At Ottawa we are crossing the cultivated sorts with the wild strawberry obtained from different parts of Canada in the hope of getting varieties especially suited for our conditions. Seedlings from the cultivated sorts alone have not given us just what is desired. The ideal variety of strawberry for each particular soil and climate should be somewhat as follows:

Perfect. Plant hardy, very productive, vigorous, making a moderate number of runners; must withstand drought well. Foliage large, abundant, rust resistant. Flowers borne on stiff stalks of sufficient length to keep the fruit well off the ground.

pollen abundant. Fruit, large to very large from beginning to end of picking season; form, roundish conical with a slight but not prominent neck, regular; calyx or hull small; seeds not prominent; color of uniform lively, deep glossy red from tip to stem; not showing scald readily; flesh firm, red, juicy with a tender core; subacid, sprightly, with a pleasant high flavor. Season, very early to very late or, in other words, all summer.

A berry of the foregoing description is not an impossible one to realize, and if those having strawberries to introduce would have the ideal strawberry more in mind, there might not be so many inferior sorts introduced every year.

I trust that I have been able to show that the development of fruits for special conditions is important and feasible and that already varieties are known which succeed better in one district than in another. I believe that every Experimental Station in the United States and Canada, and as many private individuals as can do so, should be endeavoring to originate fruits of all kinds especially adapted to their own particular needs.

SOME HISTORY OF THE GRAPE IN THE UNITED STATES.

By George C. Husmann, Washington, D. C.

Delivered before the Society, with stereopticon illustrations, February 19, 1916.

Sacred and profane history say the grape has ever accompanied civilization and was perhaps the very first of fruits cultivated by man, and has been his best stand-by ever since, improving with him and yielding finer fruit, better products, and a greater variety of them as the years pass by.

In this country records show that considerable wine was produced from native grapes in Florida in 1564. In 1607 Pale had established a vineyard of three acres at Henrico, North Carolina. In 1616 Lord Delaware urged the London Company to promote grape culture in Virginia, resulting in sending in 1619 for such purpose expert vine dressers and a collection of the best varieties of French grapes. Acts to promote grape growing were passed by the Assembly in 1619, 1623, and 1639. Wine was also made in Virginia in 1647, and in 1651 premiums were offered for its production.

John Winthrop, Governor of Massachusetts Bay Colony, had planted a vineyard on Governor's Island, in Boston Harbor before 1630. In 1633 William Penn attempted to establish a vineyard near Philadelphia. Attention to vine culture was given by English settlers in Uvedale, now Delaware, in 1648. In Maryland, Lord Baltimore is said to have planted 300 acres of land to vines. Charles II, in 1663, sought to encourage viticulture in Rhode Island by offering inducements to the colonists to grow grapes and make wine. In 1664 Col. Richard Nicoll, Governor of New York, granted to Paul Richard a privilege of making and selling wine free from all duty, he having been the first to enter upon the cultivation of the vine on a large scale. In 1710 Alexander Spotswood, Governor of Virginia, brought over a colony of German grape growers and

settled them on the Rapidan River. In 1770 an Act to encourage wine making was passed by the Virginia Assembly in favor of Andrew Estave.

Failures of early attempts to grow Vinifera in the Carolinas and Georgia were recorded by Alexander Hewitt in 1779. Much more data could be cited that during the 200 years in which this country was being colonized, the immigrants loved the vine and its products and continued to bring with them material of vines from their native land and experiments with such, in the hands of experts, were made on a large scale, but were failures nevertheless.

Of course no one then knew that the *Phylloxera Vestatrix,* or root louse of the vine, a native of this country, was omnipresent ready to destroy the vine plantings wherever made. It, therefore, remained for continual failures with Vinifera and a few accidental successful plantings of native sorts to direct attention to the latter.

A New Era in Grape History.

To Dr. James Meade is accorded the honor of first perceiving and setting forth in print the fact that American viticulture must rise from American grapes.

Just when and where the Scuppernong was discovered will never be known. The name appears to have been applied to it the beginning of the nineteenth century. It was, no doubt, grown much before then, and appears to be the first known American native grape variety. It has steadily increased in popularity, has been distributed to all parts of the Muscadine territory and today is the most extensively grown Rotundifolia.

The Alexander which appears to be a Labrusca hybrid, the real history of which is not known, is one of, if not the first cultivated American Euvitis variety. The Colony founded by Peter Lequax in 1793, at Spring Mill, near Philadelphia, and the Swiss Society founded in Kentucky, in 1790, of which John James Dufour was leader, members of which Colony in 1801 settled at Vevay, Indiana, failed in growing Vinifera varieties, but succeeded with the Alexander.

Bland, a Labrusca × Vinifera hybrid, was brought to notice by

Col. Bland of Virginia, the latter part of the eighteenth century. This is mentioned as having well ripened in New Haven, Conn., in 1820.

Isabella, a variety of Labrusca extraction, was introduced by William R. Prince of Long Island, New York. The origin of this is not definitely known. Prince, after nearly one-half century of experimentation with Vinifera, devoted the last years of his life to the growing and disseminating of native varieties.

Flowers, the oldest cultivated black Rotundifolia variety, was discovered by Popping Billy Flowers in 1819, in Flowers Swamp, Robeson County, North Carolina.

Mr. John Adlum, of Georgetown, D. C., brought the Catawba, the origin of which is also not definitely known, into notice in 1823. He wrote the first volume on American Grapes. In 1823 Adlum wrote to Nicholas Longworth, of Cincinnati, Ohio: "In bringing this grape into public notice, I have rendered my country greater service than would have been done had I paid the National debt."

Certain it was that the culture of native grape varieties gave a new impetus to the industry and such rapid progress made that in 1830 Prince in his treatise on the vine enumerates 88 American varieties.

Since then such varieties as the Norton in 1835, Delaware in 1850, Concord in 1853, and many others made their appearance. Grape culture had gradually increased and become general throughout the land.

Ephraim Wales Bull, of Concord, Massachusetts, is deserving lasting gratitude for originating the Concord grape, the most widely known, most generally planted, all purpose American grape yet introduced. It is included in nearly every collection where American vines are planted. To illustrate how important it has become I will state that in the Chautauqua Grape Belt on Lake Erie, 192,000,000 pounds of grapes were produced in one season, nine-tenths of which, or 172,800,000 pounds, were Concord. My Father, in his treatise on grapes in 1865, said, "One-third acre of Concord planted five years ago has produced me, during that time, in fruit, wine, layers and plants, the round sum of $10,000.

The Creator has blessed this country most abundantly by giving it more native species of grapes than all the other countries of the

world combined. This has enabled America in her native grapes, not only to give to the world new fruits, but our native species being resistant to the *Phylloxera Vestatrix,* or root louse, of the vine, also serve as grafting stocks on which to grow the non-resistant Vinifera varieties and through this has saved from destruction the vineyards of the world.

Glancing over the long list of names of originators and introducers of American grapes, more than one hundred prominent names are found, among these such names as T. V. Munson, E. S. Rogers, J. H. Ricketts, E. W. Bull, G. W. Campbell, Dr. J. Stayman, J. Burr, A. C. Caywood, T. B. Miner, T. Huber, J. Rommell, N. B. White, D. S. Marvin, C. S. Copeley, Dr. L. C. Chisholm, J. Moore, W. H. Lightfoot, S. Underhill, and many others.

Reflecting that the many cultivated varieties, adjusted to the climatic, soil, and other conditions of the old world suited to all the purposes for which grapes are grown, are varieties of one species, we can not estimate the tremendous viticultural possibilities of this country which so far as is known has more native species within her confines than all the rest of the world. Pathfinders in viticulture might be compared to miners in search of precious metals. The pioneer grape grower usually prospects. One kind of land after another is tried with one kind of grape after another, resulting as mining does, in failures, good pickings, and successes. The object being always kept in mind until the goal is reached.

While what has been said was occurring in the States east of the Rocky Mountains, the Mission Fathers brought with them and successfully grew Vinifera vines in California. They grew grapes at the Missions for their own use only, the work being principally done by Indians. They had but one variety, the "Mission," which is grown to some extent in California now. It was introduced in Mexico in 1520, and brought to the California Missions as follows: San Diego, 1769, San Gabriel, 1771, Los Angeles, 1781, and Santa Barbara, in 1786. The Mission Vine exhibited at the Centennial Exposition was planted at Monticido, California, in 1795. It was 18 inches in diameter and in one season produced over five tons, or 10,000 pounds, of grapes.

From the Missions the pioneer grape growers of California received their inspiration as well as start of cuttings.

The first direct importations to California of Vinifera from Europe were by nurserymen in 1853 and 1854. In 1861 A. Harassthy was commissioned by Governor Downey to visit Europe in the interest of the improvement and growth of the grape vine in California. He selected and brought with him cuttings of nearly all the better European vine varieties.

Some Remarkable Vines.

In American grape history there are three varieties of remarkable records, each of which has been the most prominent variety of its kind.

Of Vinifera, the Mission for its wonderful adaptability, and as a general utility grape, has never been surpassed.

Of American Euvitis, the Concord is the best known, the most generally planted all purpose grape so far.

Of the Muscadines, the Scuppernong always has, and still is considered the best and more vines of it have been planted than of all other Muscadines combined.

A Mission vine planted in 1842 by a Spanish woman, ten miles south of Santa Barbara, near Carpinteria, California, was considered to be the largest vine in the world. Its spreading branches supported on sixty posts covered 10,000 square feet of ground; 800 persons could comfortably gather under its shade. The first election in Santa Barbara County under American rule was held under it. In one season it produced 12 tons of grapes. The trunk of the vine measured 9 feet 7 inches in circumference.

In the Santa Barbara Daily News and Independent appeared the following: "Carpinteria, May 4, 1915. F. S. Barrick moved the big grape vine from the Peterson Ranch to the Aliso school grounds yesterday, and it is now ready to be placed in the base of cement which is yet to be prepared. As soon as the vine has been set in the cement and properly propped, it will be covered with creosote which will preserve it for many years. The branches were cut off at a length of twelve feet from the trunk which will give the visitors an idea of the immensity of the vine when it was alive. Grape vines are to be planted underneath the ends of these branches and in time will cover the old vine and give it the appearance of having life."

A wild grape vine about one mile north of Daphne, Alabama, is called the "General Jackson Vine" because General Andrew Jackson twice pitched his tent under it during his campaign against the Seminole Indians. This vine, in June, 1897, was reported to have a circumference of 6 feet, 1 inch, at its base, and estimated to be more than 100 years old.

The "Mother Scuppernong Vine" on Roanoke Island, tradition relates Amados and Barlow transplanted there from the mainland on their first voyage in 1584. Doubtless there are native vines much older. It is difficult to estimate the age of vines because the yearly growth is not distinctly marked.

In extensive travels among vast numbers of native vines abounding in our forests, I have never seen one that died from the effects of old age.

As old world history tells us of vines 600 years old, of vineyards remaining good 300 years, and vines 100 years old being considered young, it would appear there has not been time to ascertain the age vines will attain in this country, had Columbus started such records when he landed in 1492.

Beginning of a Commercial Industry.

Summing up we find that as a real industry viticulture in this country began to assert itself about the middle of last century in all portions of the country where it is an industry now, and as such is, therefore, as yet in its infancy.

Nevertheless, unfermented juices, choice wines, dry and sparkling, are made from American grapes and a large table grape industry has been developed in the Eastern States, whilst the Pacific Coast has entered into direct competition with the choicest European wines and other grape products, has captured the raisin market of this country, and is developing a fine trade for Vinifera table grapes. The efforts of Adlum, Longworth, and others were followed by others, especially in New York, Ohio, Missouri, Virginia, Indiana, Illinois, Kentucky, Pennsylvania, the Carolinas, and Michigan. In California where the Mission had so far been the only variety cultivated the choicest Vinifera varieties for all purposes are grown.

In 1850 the country produced almost 250,000 gallons of wine. In 1860 the product had reached over one and one-half million gallons and all the States and Territories, except four, were growing grapes. The Census of 1860 shows California, New York, and Ohio as the three leading wine producing states. In 1870 Missouri produced more than any other state excepting California. From 1875 on quite a decline occurred, owing to black rot and other diseases. With the one exception mentioned, California, New York, and Ohio have taken the lead in grape growing until the last census when Michigan surpassed Ohio.

It was from 1870 to 1885, when the greatest profits ever made by grape growers in this country were realized, that the growers prided themselves in growing superior grapes of the best varieties; wine makers tried to surpass each other making the finest wines; and raisin growers to produce the choicest raisins. Through this localities became and are still known for their speciality. As for instance, east of the Rockies the Kenka Lake District for its sparkling wines; the Chautauqua District for American table grapes; the American Dry Wine Districts of Missouri, New Jersey, New York, and Ohio; the Muscadine District of North Carolina; while west of the Rockies, the Raisin Districts in Fresno, San Diego and Yolo Counties; Table Grape Districts in Sacramento and San Joaquin Valley; Dry Wine Districts of Napa, Sonoma, and Santa Clara Counties; the Sauterne District in Alameda County; Sweet Wine and Brandy Districts in the San Joaquin Valley; etc.

Ups and Downs.

During the last quarter of the nineteenth century the grape history of the United States has been a series of ups and downs, until it appears now to be getting on a more substantial footing. For instance, in some of the Eastern States grape prices in basket lots have varied with years from 3 cents to $\frac{3}{4}$ cent a pound, to bulk grapes from $30 to $4 per ton. In California bulk grape prices have varied from $35 to $40 a ton down to $6 and even less, and hogs were turned into the vineyards to harvest the crop.

Black Rot, anthracnose, insect pests, etc. wrought havoc in the

Eastern States, against which the vineyardists did not then know how to cope, while in California Phylloxera and the California vine and other disease injuries wiped out thousands of acres.

Past experiences have been such that many former enthusiasts quit grape culture. This is why some sections of the country formerly important grape sections are not growing so many grapes now, although there are now new plantings made and decided interest shown all along the line. While these experiences have given sorrowful lessons to many, knowledge has also been gained through them that could not have been obtained in any other way. After years of successes and reverses, crop shortages and productions to exceed wants of the markets created, the industry in the East, as well as in the West, has gradually settled down to a more solid business basis.

American grape products have taken high honors at all important International Expositions, including the one at Paris in 1900; they are not only rapidly replacing products of like nature formerly imported from abroad, but our grape products are rapidly finding their way into all the principal markets of the world.

Viticulturists in the United States have come mostly from two sources, namely: those born in this country, few of their antecedents having followed viticulture, they therefore having it all to learn, or, they are viticulturists from other countries, who after coming here, find it more difficult to wean themselves from set notions and adapt themselves to new conditions than beginners do to learn the trade.

Viticulture in the United States may at present be said to consist of three distinct regions, which segregate themselves by the grape species grown in them for commercial purposes. These are:

(1) The Vinifera region, in which the Vinifera varieties are grown for all the various purposes, is located almost entirely west of the Rocky Mountains, and so much of it in California that it might almost be said to be a California industry; at least 75 per cent of the entire grape output of the United States for various purposes being of Vinifera varieties. Nearly 100 per cent of the raisins and grape brandies produced in this country come from California.

(2) The Muscadine region, in which improved varieties of

Rotundifolia and Munsoniana are grown for commercial purposes. This region is found in the South Atlantic and Gulf States and along the lower Mississippi Valley, extending from Maryland, south to Texas on the west, thence north along the Mississippi River, to Southeast Missouri and Tennessee.

(3) The American Native Grape region in which improved varieties of American Euvitis are grown for table grape, wine and unfermented grape juice purposes. This is scattered over the entire United States east of the Rockies and west of the Alleghany Mountains, but carried on extensively in the States from the Hudson River west and north of the Ohio River and that border on the Great Lakes and in the more centrally located states of the Mississippi Valley. The great bulk of American champagnes and dry wines and unfermented grape juices come from this region.

Department Researches.

The United States Department of Agriculture through its Viticultural Investigations, is endeavoring to make itself useful in a broad way, in assisting in the proper development of the industry of the entire country.

These researches are demonstrating in the American Euvitis region that the failures made by the grape growers in the past were largely due to lack of knowledge, and showing what the causes of the failures were, that these can now be overcome. The investigations are assisting in the re-establishing and proper adjusting to conditions of a once pretty extensive grape industry, that had gradually been declining for years on account of lack of proper cultural, training, pruning, and spraying methods, prevalence of grape diseases and insect pests, and lack of knowledge by the growers of the best means of counteracting and eradicating such evils.

In the Muscadine regions we are determining the best methods of planting, cultivating, training, pruning, and utilizing the product of Muscadine grapes, with particular reference to determining the adaptability of varieties and the discovery, origination, and dissemination of new varieties.

An exhaustive research into the self-fertility and sterility of the

species has been made and remarkable successes have accompanied our breeding investigations, resulting in self-fertile vines, the first of their kind so far known, as well as a number of remarkably promising crosses between Rotundifolia and Vinifera and American Euvitis. Our pruning and training experiments bid fair to revolutionize the methods heretofore practiced with Muscadines.

In the Vinifera regions, we are making a comprehensive test of resistant varieties of vines to determine their adaptability to the different vineyard soils and climatic conditions; we are ascertaining the congeniality of the Vinifera to different resistant stock varieties; we are determining the varieties best adapted to different localities and uses; all classes of grapes are being tested with reference to their resistance to insects and diseases which have been doing serious injury to the vineyard, and if found necessary will undertake to originate an entirely new class of grapes better adapted to Pacific Coast conditions. These researches are well under way and a number of important determinations have already been made.

Growth of the Industry.

The recent growth of the industry has been remarkable as is shown by the following figures:

In 1901, 7,635 car loads; in 1914, 14,273 carloads of table grapes were shipped. In 1901, 31,050; in 1914, 49,685 cases of grapes were canned; in 1901, 74,000,000 pounds; in 1914, 196,000,000 pounds of raisins were cured. In 1901, 1,688,500 gallons; in 1914, 6,765,119 gallons of grape brandy were produced. In 1901, 37,250,000, in 1914, 48,900,000 gallons of wine and unfermented grape juice were made. In 1900, there were about 275,000 acres; in 1914, 450,000 acres in grapes. In 1900 value of crop about $14,090,000; in 1914, $41,500,000. In 1900, 1,300,750,000 pounds, in 1914, 2,750,000,000 pounds of grapes were produced. This shows that in a little more than a decade the Viticultural Industry of the United States has more than doubled itself and now represents an investment of at least $300,000,000, giving employment to 150,000 persons and yielding an income for grapes and their products of nearly $50.000,000 per annum.

The total grapes produced for commercial purposes in 1914, if figured in carload lots, would mean a train of 137,500 cars. No other fruit industry in this country can show such a record. This in spite of all the difficulties encountered certainly pays a tremendous tribute of love for the vine.

Credits.

Of credits that should be placed to American viticulture I would mention the following. We are rapidly improving on the already good methods we have of packing, handling, storing and marketing of table grapes. We are not only producing all the raisins we consume but are becoming exporters of them. We are keeping pace with improved methods of fermentation, cellar treatment, and excel in methods of transporting and shipping of wines. The sparkling wines made in this country from American, as well as Vinifera grapes, are rapidly replacing those heretofore imported. The unfermented grape juice business has rapidly become an important speciality. We are making and consuming a number of new grape products.

In machinery for harvesting, handling, working grapes into products and transporting the same, we lead the world. What a wonderful change in equipment and great saving of expense in cellar management have been brought about through the must pump and what an expense in costly shipping cooperage will be eliminated by the shipments of wine in bulk or tanks aboard cars or vessels. We have learned to control our most formidable grape diseases and insect pests.

American native grape varieties as Phylloxera resistant stocks have been the means of saving the viticulture of the entire world. This and much else already accomplished speaks well for an industry as yet in its infancy.

Our viticultural investigations have about convinced us that we will soon know how to grow within our confines the forty to forty-five million pounds of currants we annually import and consume in this country, and why should we not also grow the two hundred and fifty to three hundred and fifty thousand barrels of grapes packed in sawdust, annually imported into this country. It has already

been demonstrated that specially prepared sawdust from the California Redwood makes an excellent substitute for cork-dust.

No other plant yields such an abundant annual crop for as long a series of years; neither is there a plant that can be successfully grown under such a variety of conditions at as small expense as the grape.

Future Possibilities.

If we will avoid errors and overcome obstacles met in the past by application of information gained by experience and researches since; if we study grape varieties, soils, climatic and other conditions, and plant vines with specific purposes in view and train, prune, trellis, fertilize, cultivate and otherwise care for our vines, so as to bring about best fruiting results; if instead of worrying the industry by trying to legislate people to be good, we educate them to appreciate the real merits and healthgiving and nutritive value of the grape and its many products; that the juices fermented or unfermented are natural beverages of intrinsic food value and promoters of temperance and health when taken in reasonable quantities; if instead of trying to produce quantity for a few of the bulk markets, we also work for quality and distribute our products more generally, so the consumer is not called upon to pay three or four times as much as the producer gets for it and so instead of as a luxury, they will be used as food and through this incidentally, but very directly, offering inducement to viticultural pursuits; if all interested in the industry will have more confidence and seek to help each other and all do something to develop and increase the sale and consumption of grapes and their product, remembering that there is no other fruit so delicious that can be used for so many purposes and that it always has and ever shall be considered the Creator's choicest gift in plant life to man; if we consider that all the cultivated foreign varieties come from the Vinifera, a single species, which also thrive in large areas of our domain; that we have more native species within our confines than all the rest of the world combined and no reason presents itself why varieties should not be cultivated wherever native vines are found, and some of these are found in nearly all parts of the country, it looks as though the viticultural possibilities that lie in store for the United States are almost unlimited.

GARDEN WRITINGS IN AMERICA.

By Leonard Barron, Garden City, N. Y.

Delivered before the Society, February 26, 1916.

The development of strictly garden writings in America is a very recent growth, so recent, indeed, that it may be claimed as a feature of the last twenty-five years. Although gardening books have been published in America in fairly considerable numbers from the very beginning of the country, still many of these have been of European origin. It has been a common practice to import sheets of English books and to bind them up in this country, with a special title page and an American publisher's imprint. In other cases, the plates have been imported and an edition put out over here. This has led to much confusion in the past and we can lay claim to have produced only very recently any strictly American writings on the fine art of garden craft — writings that really reflect the native spirit. This, however, has been but a natural reflection of the condition of the art of garden making itself.

The written word is the permanent record of events, and there is yet much work to be done in the study of our garden writings from an historical point of view. Those who are concerned with this phase of the question will find the most comprehensive review to date in the third volume of the new *Standard Cyclopedia of Horticulture.* That the literature of our American gardening should be thus flavored with foreign lore up to very recent times is nothing to be surprised at, since not only were the beginnings of American garden craftmanship based on the practices of England and the continent, but also the actual materials — the plants — employed were imported; and indeed an overwhelming proportion of our early practitioners gathered their experience abroad before coming to these shores. This City of Boston is inseparably associated with the beginnings of gardening here in America, of which fact the organization under whose auspices we are now gathered is in itself sufficient proof; and today this section of the country still

stands as perhaps the most advanced center of garden interest in the United States.

It is not my intention today to call your attention to the best books, so much as it is to direct it towards a consideration of the tendencies of contemporary garden writings and publications, in an effort to measure up our possessions and our needs.

The literature of gardening and horticulture in this country dates back but a little over a hundred years, for it appears that the first purely American book written from an American point of view was Squibb's *Gardener's Kalendar for South Carolina and North Carolina,* Charleston, 1799, which ran into several subsequent editions. This was followed in 1804, in Washington, by *The American Gardener,* of John Gardiner and David Hepburn. This volume also had several editions. But prior to this latter there was published in Boston an edition of Marshall's *Introduction to the Knowledge and Practice of Gardening* (1799). The bad example here set of republishing a foreign work has continued to this day and has, I believe, had much influence in confusing the home gardener and hindering real appreciation in garden work. To the professional gardener or horticulturist, these books are decidedly useful; but for the amateur gardener, they have been somewhat of a handicap because he was not in a position to interpret them in the light of reason. Thus the very effort to promote popular interest in gardens has at times reacted to its disadvantage.

A glance over the bibliography of horticulture in America reveals curious and interesting developments; and through it we see reflected the progress of gardening to the present day marked revival,— or shall I say evolution? — into a real garden spirit that we all recognize. The garden proper is an enclosure, an intimate part of the home surroundings, and with the early settlements came the old-world desire to develop this appurtenance of the home. But economic conditions soon made their influence felt and the garden idea quickly gave way to that of broader, more open cultivation of crops in fields and orchards. As a consequence, horticulture in its broader sense came to be the dominating character. Attention was concentrated on the utilitarian aspect rather than upon the aesthetic. Fruit growing overpowered everything else and, indeed, became so dominant that the word horticulture is

generally accepted as indicating pomology. This tendency began to manifest itself as early as 1802, when Cobbett's edition of Forsyth's *Treatise on the Culture and Management of Fruit Trees* appeared in New York and Philadelphia, but the first truly American book on fruit growing appeared in 1817 — Coxe's *View of the Cultivation of Fruit Trees.* Thatcher's *American Orchardist* appeared in Boston in 1822. From that time onwards, for fifty years or so, pomological works appeared in plenty and completely dominated horticultural literature.

Then came the Civil War, and a marked cessation of literary production in this particular line as in everything else. Since the collection of American books on horticulture and gardening has received so little attention in the past, we have very few sources from which to draw information. The two most excellent collections are that of the Massachusetts Horticultural Society and the private library of Dr. L. H. Bailey, whose account of these earlier North American horticultural books is undoubtedly the best available and whose data I accept:

"In the introduction to the *History of the Massachusetts Horticultural Society* (1880), it is said that 'Mrs. Martha Logan, in South Carolina, when seventy years old, wrote a treatise on gardening called the *Gardener's Kalendar* which was published after her death in 1779, and as late as 1808 regulated the practice of gardening in and near Charleston. She was a great florist and uncommonly fond of a garden.' In the Charleston library there is no separate book of this kind, but the *Gardener's Calendar* by Mrs. Logan appears in succeeding issues of the *Carolina and Georgia Almanac,* comprising six pages. The earliest date there available is in the Almanac for 1798. It has been spoken of as a pamphlet, and it may have been reprinted separately. The first almanac printed in South Carolina was Tobler's for 1752. This almanac contains a '*Gardener's Kalendar,* done by a Lady of this Province and esteemed a very good one.' Perhaps this work was by Mrs. Logan. There does not appear to be any book by Mrs. Logan in the antiquarian libraries or lists, although Evans apparently erroneously included it in Vol. IV of his *American Bibliography* as of the date of 1772. Mrs. St. Julien Ravenel, in *Charleston, the Place and the People* (1906), writes that 'Mrs. Logan was the daughter of the

gallant Colonel Daniel.' Her *Gardener's Chronicle,* written when over seventy, was in great demand formerly, but seems to have utterly perished, the most careful search failing to produce a copy.

The almanacs were important mediums of information in the early days, and it is probable that some of the first instruction in gardening was given in them. In *Poor Will's Almanack* for 1787, printed in Philadelphia in 1786, there is a *Gardener's Kalendar, or useful memorandums of work necessary to be done, monthly, in the gardens and orchards of the Middle States.* The *Southern States Ephemeris* for 1788, printed in Charleston in 1787, contains a 'new and copious gardener's calendar' for the southern states. In Isaac Brigg's *Georgia and South Carolina Almanac* for 1800, printed in Augusta in 1799, there is a calendar by Robert Squibb. The agricultural matter in the New England almanacs is well known.

"In 1796 there was printed at Newburyport, Mass., by Blunt and March, for John Dabney, Salem, *An Address to Farmers* on a number of interesting subjects. It contains a part or chapter on the character of a complete farmer; one on the profits of a nursery; another on the advantages of an orchard.

"Apparently the earliest separate book on a horticultural subject published in North America (if the Logan is not counted), was Robert Squibb's *The Gardener's Kalendar for South Carolina and North Carolina,* published in Charleston in 1787, and again in 1809, 1827, and 1842. The second work appears to be the American edition of Marshall's *Introduction to the Knowledge and Practice of Gardening,* Boston, 1799, already referred to. The second indigenous book apparently appeared in 1804, *The American Gardener,* by John Gardiner and David Hepburn. It was published at Washington. This book apparently had an extensive sale. It was revised by 'a citizen of Virginia' and republished in Georgetown, D. C., in 1818. A third edition appeared in 1826.

"This book was followed in 1806 by Bernard M'Mahon's excellent and voluminous *American Gardener's Calendar* in Philadelphia. This work enjoyed much popularity, and the eleventh edition appeared as late as 1857. For fifty years it remained the best American work on general gardening. M'Mahon, remembered in the Mahonia barberries, was an important personage. He was largely responsible for the introduction into cultivation of the plants collected by Lewis and Clark.

"These early books were calendars, giving advice for the successive months. They were made on the plan then popular in England, a plan which has such noteworthy precedent as the excellent *Kalendarium Hortense* of John Evelyn, which first appeared in 1664, and went to nine regular editions. Other early books of this type were An Old Gardener's *Practical American Gardener*, Baltimore, 1819 and 1822 and Thorburn's *Gentleman's and Gardener's Kalendar*, New York, the third edition of which appeared in 1821."

It is of interest to note the marked importance of the South in those earlier days. Again this emphasizes and illustrates the English influence on the beginnings of American gardening, for the settlements of North Virginia and New England trace their connecting lines back to one common source. That the ultimate garden spirit, as we preach it today, should have its greatest accentuation in and around Boston is not to be remarked as wonderful; it is but the working out of inevitable economic and political laws. The Dutch settlement of New York, lacking the soul and spirit of these other garden sections, has failed to leave any impression of itself on our American gardening today.

It has already been pointed out that the earlier writings, so far as the records show, were of the general character of calendars. We might, then, work out a Development Chart of our garden writings something like this:

Past	Compendium or Didactic	Calendrical Topical Text book
Present	Expository	Subjective (one garden) Objective (gardens in general)
Future	Record or Descriptive	Special treatises Reviews and Imaginative

These classifications are arbitrary and not exact, but they will serve as a basis for discussion. As a matter of fact, they overlap largely in all directions.

To proceed with details. All the earlier publications fall into

the first of these divisions, being merely concerned with the practical work of the moment — what, when, and how to plant or cultivate. The highest development of this class is the text book, which is a present day development and has attained a greater perfection in America than elsewhere. So fast, indeed, have volumes of this type succeeded one another within the last few years that they now form a very considerable group by themselves.

Both the Calendrical and the Topical books are the product of the practical worker who lays down a rule of practice based on experience, but one which he does not, because he too frequently cannot, explain. The text book, equally didactic, is, however, based on principle and reason; it is obviously a natural development of and from the two former types. The period of text book writings has, I feel, reached its zenith, but other books of a more imaginative type have reborn the interest in garden work and are making it something far ahead of what it was a hundred, fifty, or even twenty years ago. The appearance of this particular kind of writing has been marked by the development of a new type of garden writer — the skilled observer scientifically trained — the professional teacher or experimentalist. Is there a danger signal to be hoisted here? Is there not a possibility of the loss of something valuable in the very evident tendency of the modern practitioner to refrain from putting his experience and observations into some permanent form? While we need the teacher, and welcome him, do we not also need the matured conclusions of the worker whose experiences are an end to themselves? It was largely by his contributions that the garden craft of the past was enriched; it is his writings we need now, and which future students will need in order to understand and measure up the conditions of today, just as we ourselves try to reconstruct the past by studying the writings of the old timers.

The second group, of Expository writings, approaches more closely to the domain of fine literature, and several volumes of recent date have successfully reached a large circle of readers. In this category I submit, as examples,— not necessarily as the best representatives of this class — *The Garden of a Commuter's Wife* (Mrs. M. O. Wright), *A Woman's Hardy Garden* (Ely), *The Well Considered Garden* of Mrs. Francis King, and *What England Can Teach Us About Gardening* by Wilhelm Miller.

Here, indeed, is a wide field for development, and one which perhaps most concerns our present purposes. This type of writing, in connection with the third group of Record and Description, is suggestive of the future of our writings.

Would that we had many more of this class of book which reflects the sheer joy and delight of the living companionship of the growing plants, the fascination of nursing the tender exotic, the rapt delight of opening spring and ripening autumn. These books treat not of gardens as things apart, but as integral elements in the round of our daily existence. The appearance of several such within the last few years is a reflection of rapidly changing conditions of our environment.

Though to the contemporary teacher and student these writings have perhaps only a moderate value, yet they are strongly significant of the new garden spirit that is enveloping all America. Let us encourage them by every means in our power for they are spreading the gospel of popular home gardening, of personal gardening, like that which is recognized as having existed in England for a long time past, so that it has come to be a recognized habit to compare the garden interests of the two sides of the ocean, to the disadvantage of our own.

Just as real, permanent progress in our widespread American horticulture (of the garden) must rest on the development of the amateur as distinguished from the mere trader, so, too, must we look to a literature of enthusiasm based on the amateur's keen interest in others of the same class to develop and at the same time to reflect the present-day condition. Authoritative gardening writings come to us from England today even as in the earlier times. But as yet we send very few thither. Still I have not the least doubt in the world of our ability to eventually produce our counterparts of Miss Jekyll, Miss Willmott, Reginald Farrar, Joseph Jacob, and others too numerous to name, but all of whom have given the world garden books based on personal experiences and enthusiasm. Keenly critical, too, they are monuments marking the progress of our delightful craft. This, of course, presupposes the existence of competent authors, well informed amateurs, to make experiments, suffer trials and disappointments, achieve successes, and then chronicle them.

I believe in the future, though conditions of garden lore in England and America are not now the same. It may indeed be said that a knowledge of gardening is a necessary part of a liberal education across the sea, whereas with us an intelligent acquaintance with gardens is indeed quite exceptional. How many American ladies will naturally invite you to stroll around their gardens to see the latest novelty in herbaceous plants, or the newest shrub from China? How many American men will invite you to stroll into the conservatory or greenhouse after dinner? Until these things or something like them happen, garden writings of the expository kind cannot be successfully produced among us because the publishers cannot afford to produce them for an unresponsive public.

As forming the third great class are the writings of Record, Description and Imagination. Here we look for the highest type of work, both as regards subject matter and method of presentation, literary quality, not mere manufacturing perfection (for a worthless book may easily be launched on its way with all the superlative trimmings of the publisher's art. Good looking covers do not necessarily mean worth-while contents). This type of book may be called the book of the future; yet that it will come is certain. Indeed, the beginnings may be said to be here. As examples of recent publications that more or less answer this requirement I cite Thomas's *The Practical Book of Outdoor Rose Growing, The American Flower Garden* (Blanchan), and *The Garden Blue Book* of Holland. Books of record carefully written in the light of all contemporary available knowledge, yet inspirational and practical, are the ideals that we set before us. That there are differences in character and calibre, great differences, as between the first and the last types of book is evident. To exactly grade these differences is a difficult task and the effort here made is open to criticism.

The transition of garden literature has been from the dogmatic and empirical through a few topical volumes to the teachers' text books and manuals of commercial interest, to the finer inspirational writings that are just looming upon us. First the practical worker, then the trader, followed by the investigator and teacher and the enthusiast who gardens for pure joy.

It would seem that much of the ultimate writings of gardens are to be done by women. Modern women writers who are addicted

to the garden habit are, however, following an ancient precedent, for have we not seen that the earliest *Kalendar* of all, the very beginning of our subject, was by that "great florist, uncommonly fond of a garden, Mrs. Logan of Charleston"; and I am glad to note this present-day tendency for I do sincerely believe that it will be women of America who will give to American gardening its real stamp of aesthetic individuality. Women as garden writers are also making an impression abroad.

A significant factor to be borne in mind is the influence of the garden clubs, the membership of which is composed almost wholly of women. These organizations are serious and from their membership is bound to come a new body of observers and recorders. I look to a very strong influence from this direction on our garden writings in the very near future. Indeed, the beginnings are already with us. Mrs. King, of Michigan, has already published one book, her writings in the periodical press are familiar, and her activities in garden propaganda in general are well known. Similarly, we may recall the names of Mrs. E. A. Stokes Peckham of New York, Mrs. J. M. Patterson of Virginia, Mrs. F. N. Doubleday (Neltje Blanchan) of New York, and Miss Louise Shelton of New Jersey, as pioneers in the new amateur garden movement whose writings of gardening are already bearing an influence.

It has been my privilege to address a considerable number of these garden clubs, and I am able to bear personal testimony of the intensity of purpose, and of the frequently well-informed status of the members. And this group of people is raising up among us a new class of readers whose requirements must be met adequately in contemporary garden writings. Here will come the demand for writings of the third class.

The activity of book productions reflects very exactly the general conditions of the country. This can be clearly seen in studying the chronology of our subject. It would almost seem indeed that garden writings can be charted into a very true curve of the general business situation; for quite apart from the natural growth in volume as time progresses we can trace very interesting and illuminating fluctuations.

In times of progress and great business activity the presses deliver a greater number of different works than in the intervening periods

of depression and stagnation. In the total publication list of approximately a thousand titles up to the end of last year, we find that practically one-half have appeared since 1890, or say within a period of twenty-five years; and that nearly one-half of that number, or twenty-five per cent of the entire production of American gardening books from the very beginnings of time, is encompassed within the last ten or twelve years! Wherefore I prefer to look into the future of things rather than to do more than call your attention to the past. And besides it is safer. Who can say what the future will develop?

A canvas of the publications of the last ten years reveals that out of about two hundred different titles issued and classified in the publishers' trade lists, within the class and group headings of Gardening and Horticulture, forty-seven, or about twenty-five per cent., are devoted to fruit growing, which evidently still claims a large share of attention; but various phases of pleasure gardening (apart from landscape work) claim a slightly greater proportion, being represented by fifty titles. Others are: Landscape, 11; vegetables and truck gardening, 31; literary, 13; children's garden work, 9.

Books devoted to technical landscape architecture are not considered in our present review, because although allied to gardening and having their origin there, still they deal with a subject matter that is becoming rapidly divergent and tending to form a special subject by itself.

It will be observed that our writings offer very few treatises devoted exclusively to one kind of flower or plant, although as long ago as 1828 the first American book devoted wholly to flowers appeared, assuming that Roland Green's *Treatise on the Cultivation of Flowers,* issued in Boston in that year, was really, as it seems to be, the earliest. This is a little volume of only sixty pages and is interesting as being possibly a fair reflection of the plants grown at that time. Naturally, many subjects that are now almost as household words among us, do not appear, and quite a number that do appear there are not very seriously considered today, as myrtle, camellia, fuchsia, passion flower. It would be well worth the while of modern-day enthusiasts who clamor for old-fashioned gardens, to look in the old garden books for the plants that they

must justifiably use. What a lot of modern-day favorites would be barred! One notable omission alone from this list is sufficiently suggestive — the phlox. The dahlia was favored with a treatise all to itself, appearing in Boston in 1839. Then came Buist's *Rose Manual,* appearing in Philadelphia in 1844 and on the same subject in 1846, Prince's and then Samuel B. Parson's Manuals. Both these books achieved a considerable degree of popularity. Rose books have been published occasionally ever since.

Of more recent other writings devoted to other special flowers, reference may be made to Ward's *American Carnation Culture,* Galloway's *Commercial Violet Culture,* Harrison Dick's *Sweet Peas for Profit,* and Holmes's *Commercial Rose Culture,* all of which it will be observed are decidedly of a commercial character. Doubleday, Page & Company's Garden Library contains small volumes on *Roses, Narcissus,* and *Water Lilies;* H. S. Adams has contributed a little manual on *Lilies;* and the Rev. C. S. Harrison has given us small pamphlets on *Phlox, Iris,* and *Peony.* But in a general way we are still dependent upon importations for specimens of this type of work other than those having a distinctly trade or commercial bearing. The book on the Dahlia just mentioned was followed more than fifty years later by a small treatise on the same subject, by Lawrence K. Peacock, now out of print. The fact remains that there is no great market yet created in America for these manuals of special plants. Here again we can only hope for, and look to, the future.

More important, perhaps, than the separate books, in reflecting the contemporary spirit in any subject, is its periodical literature, through which, week by week or month by month, ideas and thoughts are communicated. Not only are the serial publications more responsive to the contemporary impulse, but they also reach a wider audience, and that far more quickly. Whereas a fairly successful book of a technical or special character will be considered as doing well if it sells 2500 copies or from that up to 5000, in the four or five years of its greatest popularity, a well-established and successful periodical will reach from twice to ten times as many as that maximum, and do it every week or month as the case may be.

On the other hand, with few exceptions, the book is a better unit

for distribution and for collection. A book has a more permanent character. People instinctively save books while they destroy current journals and magazines, and they will pay more money for books.

The periodical literature of horticulture in North America has been vastly greater than the literature of bound books in the same field. There have been started from time to time, approximately 500 journals most, if not all, of which are but memories today. Associated with this class of publications must be included the reports and proceedings of various societies and associations, but in this type of garden writing the spirit which we are specially considering today has had very little place. The pomological and other fruit-growing interests have completely swamped the more intimate associations, the aesthetic side that deals with home surroundings. The reports of the "flower committee" or the "garden committee" are usually perfunctory documents of little or no practical value to anybody. With the exception of parts of the proceedings of the Massachusetts Horticultural Society, the Horticultural Society of New York, and some local Canadian Societies, there is very little of permanent garden interest to be found in these records. Special flower societies devoted to the gladiolus, the peony, the rose, the sweet pea, the carnation, etc., record from time to time matters of progress in their particular fields, and more permanent value has been given to some of these documents, through the coöperation of certain State Experiment Stations. Records of the introduction of new varieties may be found here and in the combined reports of these organizations included in the proceedings of the Society of American Florists. Here some attempt is made to keep a record of new plant introductions in so far as they are brought to the notice of the organization through registration.

A few of the garden clubs have separate periodical publications printed for circulation among their members only, and these contain some notes of a critical nature, that bear relationship to the imaginative and the record type of writings of which we have seen the beginning in some of the more recent books.

The periodical may be said to blaze the way for the book. It can feel the way and get a quick response; but more than this, the

periodical is the great engine for opening up and developing new lines of interest. From a strictly garden viewpoint the periodical publications of the past can be reviewed very quickly, for all the earlier journals regarded agriculture as their prime interest and merely permitted horticulture and gardening to trail along in their obscure little corners.

There have been only three or four publications with general, broad garden sympathies. *The Floral Magazine* began in Philadelphia in 1823, and contained colored plates of various ornamental plants. Report says that it was discontinued because it did not pay. It was conducted by the Landreths, nurserymen and seedsmen, as indeed were various subsequent periodicals devoted to plants, flowers, and gardens, evidently in the nature of altruistic contributions by commercial establishments made with the idea of extending and promoting the interests of the business in which they were directly engaged.

The Horticultural Register, supported by Joseph Breck, began in 1835 in Boston, as also did Hovey's publication, *The American Gardener's Magazine*, which soon becoming *The Magazine of Horticulture* and continuing until 1868, remains as one of the most interesting publications of the country. Thus to Boston again is added one more honor. Hovey was a nurseryman.

In 1846 appeared the first number of the next important publication, Downing's *Horticulturist*, in every way a splendid publication, reflecting adequately the best horticultural spirit of its period. This publication started as a little stream and, appearing in different forms in different cities, gradually grew in importance and received as tributaries numerous other publications. The *Horticulturist* can be traced in direct line of descent, with its absorptions, clear down to *American Gardening*, the publication that ceased to exist in 1904. It was edited successively by A. J. Downing, Patrick Barry, A. J. Smith, Peter B. Mead, and G. B. Woodward, names sufficiently well known in the horticultural and gardening annals of this country. Naturally, it began with a strong leaning towards pomology and gradually swung over towards the development of private grounds and the embellishment of gardens, considerable attention being paid to ornamental plants, trees, and shrubs. *The Gardener's Monthly* began in Philadelphia in 1859

and continued till 1887, reflecting from its pages the teachings and the great appreciation of plants of Thomas Meehan, its editor. This is straight line of descent of an honest effort of early professional horticulturists to introduce their wares to the public by a campaign of impartial education. In 1887, both the *Horticulturist* and *Gardener's Monthly* were absorbed by the *American Garden*.

The origin of the *American Garden* itself was from two independent sources of which the *Ladies' Floral Cabinet*, beginning in 1872 and issued from the office of the *Horticulturist*, was one. The basic idea of this periodical was that the cultivation of flowers was essentially an occupation for women. It was a fairly successful venture and represented a type of periodical that does not exist today. It was amateur and parlor gardening in its simplest and most elemental form. In 1880 the publication changed hands, and still again in 1882, when Ralph Waggoner assumed possession, with C. L. Allen as editor-in-chief. In 1887 it was absorbed by the *American Garden*, which later absorbed also the *Flower Garden*, edited and published by C. L. Allen and subsequently by Beach Sons & Company and B. K. Bliss.

It will be noted here that the proprietorship and management of these publications have been entirely in the hands of those interested commercially in the plant and seed trades.

With Bliss' ownership, Dr. F. M. Hexamer became editor and under his management the quality of the material published reached a higher plane, the contents being divided into definite "departments," as they were called, the whole publication, however, being a periodical calendar and notes on the introductions of the moment. In 1890 and for three years later, L. H. Bailey was editor. *The American Garden* at this period assumed definite magazine character, the subject matter being of the expository character with some attention to articles of record and description.

In 1892 *Popular Gardening* was absorbed. This was an *olla podria* of anything and everything that related to the growing of plants, fruits, flowers, and vegetables gathered from anywhere, but it had struck a really popular note. Its principal thought and aim was to stimulate the improvement of home grounds. This publication was itself an absorption of so many other lesser magazines from various parts of the country that it is quite bewildering

even to think of them. The combined *American Gardening*, as it was called, however, soon fell into bad ways, and gradually dwindled till publication was suspended in 1904. Simultaneously with the decease of *American Gardening, The Garden Magazine* arose, and I became associated with it in its second number.

There are essential differences between weekly and monthly publications and the kind of writings they convey. In the weekly periodical news, up-to-date comments on events of the moment, and chronicles of contemporary happenings demand the greater space. News has no part in a monthly magazine, but instead the subjective and expository treatment is all important. The news of what is happening in horticulture is catered to by four trade papers, with interests restricted essentially to the trade and profession. These are the *American Florist, Florists' Exchange, Florists' Review,* and *Horticulture.* We should not leave the field of past periodicals, however, without paying tribute to the notable effort inspired in this city and which launched the *Garden and Forest,* which ran from 1888 to 1897. This publication really set the highwater mark in quality of contents in its effort to introduce horticultural appreciation and the garden spirit to the people of America. A success in its mission, it was not so commercially. Why? Because in our complex modern life, writing is a commodity and has to be put on the market and sold like other commodities; in other words, it needs a publisher. It does not suffice to simply issue a sheet from the press.

The periodical is our best measure, then, of the conditions of the moment. It is made up of all kinds of writings which may also be analyzed and grouped in the manner already suggested. To be successful it must primarily satisfy a sufficiently large number of readers to make it a vehicle of communication between those who produce and those who consume. There are two factors which go hand in hand in making the modern periodical — the editorial or text matter on the one side, and the advertising or trading matter on the other side, and this inter-relationship is particularly marked in what are known as class, or trade, journals. Trade journalism in garden matters has reached its highest development in America, and commands the services of a large number of writers and workers; but the trade journal, the better it serves

its special purpose as a trade organ, the less it becomes adapted to the needs of those who are outside the commercial field and who garden for pleasure. The editorial point of view is restricted. Money making is the object of the tradesman; but money spending for the delight of acquiring what it can purchase is far more important to the enthusiast — to whom the term amateur is so unfortunately applied. The greater public influence in spreading the desire for gardening lies outside the field of the trade publications.

Publications of both kinds are essential. The trade cannot exist without the amateur enthusiast to consume the products; the amateur cannot indulge his hobby without the trade to supply his needs. Therefore, I submit that the trade and the professional man should look with a more kindly eye on the so-called "amateur" organ. The so-called ideal publication, encompassing all phases of the craft, trade and amateur together, can probably never exist. The ideal is false. The true ideal should be to cater neither to the trade nor to the amateur, but instead, to deal with gardening and horticulture in their broadest significance, instructing, entertaining, and attracting all interests as individuals, not as organized groups. This, at all events, is the ideal that I have set before myself.

A comparison of the contents of the earlier and present day periodicals is illuminating, though it practically parallels what has already been discovered in regard to garden books. I have heard it held as an indictment against the contents of the periodicals today that the garden writings now being offered in their columns are, on the one hand, too amateurish, catering too much to the uninformed; and at other times, that they are too technical and erudite, catering too much to the technician.

It all depends on the individual point of view. It is not easy to satisfy everybody, simultaneously and continuously. The periodical is designed to reach the greatest number of people of *all* interests. It is a teacher, an educator, a reporter, an idealist, all these at one and the same time. The relationship of an editor to the public is many sided; his constant occupation is finding out what the public wants and then finding the writers who can supply it. He is also the buffer absorbing the shocks from both sides. In reality, in the last analysis, it is the public itself that edits the periodicals it reads.

A tremendous transformation has overtaken the character of garden writings in periodicals during the last twenty years, but more especially within the last decade. We have seen the birth and growth of a certain group described popularly as the "country life" class. The individuals to whom this group caters have been imbued with that now almost universal desire of the American people to ally themselves with everything that has to do with the greater outdoors, spreading out from the cities and living more and more in the country and *on* the land, not *off* the land. These periodicals, indeed, are but an expression of that movement, which again illustrates that the people are the final editors. Country living has called for better homes, better houses, better grounds, better gardens, and this has called for a new kind of garden writing, which has largely been met. In catering to, and stimulating this sense of appreciation of the beautiful, the periodicals have assumed a sumptuousness of presentation and appeal and an appropriate correlation of methods and ideals.

The periodical writer is not only the reflector of present day conditions but he is also one of the most potent influences in shaping coming events, and in our gardening papers of wide circulation today, we discern the all consuming eagerness of the people for gardens of greater intrinsic interest and greater variety. We want more writers of ability acquainted with plant materials and their possible uses, forward looking, who can discern the needs of the American home and suggest appropriate methods of meeting them. They must have knowledge and imagination combined. Where are we to find such?

The nurseryman, wrapped up in the methods and intrinsic interests of his products, seeing them at very close range, usually lacks appreciation of the needs of the uninitiated.

The suburban amateur, on the other hand, can hardly formulate his needs; he is groping in the dark and crying for light, which the professional should be able to give.

The trained investigator and teacher is usually too much concerned with the data and laboratory methods to be able to tell convincingly and entertainingly the very things he wishes to impart; he cannot see the woods on account of the trees.

The commercial florist has a viewpoint too narrow and different from those who are developing the great outdoors.

The private gardener *should* be the best fitted to teach the larger public, for he is in a position to appreciate most thoroughly the needs and the longings of those with whom he is associated.

The skilled amateur has gone through the mill of his own experiences, and the true hobbyist is well fitted to teach and lead those who are coming behind.

The graduate of training schools and botanic gardens is entering professional and commercial channels, thus getting practical experience on a sound basis and can provide much that is required.

The handicap of all these — of everyone, indeed — lies in seeing his own sphere of interest in too great a proportion.

Garden writing for America is too great a subject, with too many sides and faces, to be treated from any one standpoint, by any one individual. Yet I am satisfied that the needs of the case are being met, and that the future garden writings of America will be interpretive and inspiring on a scale that the immensity of the subject demands.

The periodicals themselves exhibit the changes from the old orders and the beginning of the new. Formerly, they were the personal expressions of one individual; the editor was rather a preacher advocating his special cause or point of view, and indeed did most of the important writing. His publication was a personal expression, subject to all the dangers of narrowness.

Today, the editor writes little, practically nothing of value, but he offers opportunity for the expression of all phases of thought and differing viewpoints of all interests. What is wanted, indeed, are writers to use the opportunities.

METHODS USED IN THE PROPAGATION OF PLANTS.

By Theophilus D. Hatfield, Wellesley, Mass.

Delivered before the Society, March 4, 1916.

The profession of gardening is very much like the profession of medicine and the gardener may safely call himself a plant doctor. He brings plants into the world, takes care of them in sickness and in health, but, like the Chinese doctor, he is paid for his services only on condition that he keeps his patients well.

With gardening operations in general and particularly in the propagation of plants there is much that is experimental. The old saying is as true as ever "It is easy when you know how." Intuition, no doubt, plays an important part, practice makes perfect, we often guess and guess right, and if we don't succeed we try again.

When a young man it was my duty to wait on the propagator; help to make cuttings; tie after budding; clay after grafting; and otherwise fetch and carry. I often wondered how the propagator had accumulated so much knowledge and figured on the time it would take me to know so much. As I grew older and began to study the plants under my care, to get interested in wild plants and nature in the woods and pastures, I found many questions answered and I have found that nearly all the methods used by man in the propagation of plants exemplified by nature herself. As Shakspere observes

> "'Tis an art that doth mend nature,
> Change it rather, for the art itself
> is nature."

The propagation of plants may be divided into the following classes: from cuttings; by layers; by grafts; by division; and from seeds and spores.

Cuttings.

The first thing necessary is a propagating bed and the means to care for freshly rooted plants; just as an incubator is needed to hatch eggs and the conveniences for caring for the chicks when hatched. If one has a greenhouse it is easily done. Close a part of a bench with glazed sash or with cotton cloth as many florists do. Bottom heat will be needed which can be obtained by closing in the hot water pipes under the bench. About five inches of good clean gray sand, as a propagating medium, is necessary and head room above the cuttings. There should be a few degrees more heat in the bed than in the air; 75° to 78° is about right. If there is too much bottom heat vents must be provided to allow the surplus heat to escape.

If one does not have a greenhouse, a box with a pane of glass can be used and set over another box with a lamp underneath, incubator fashion, this with the means of controlling the temperature will furnish quite a serviceable bed.

The propagating bed will be mainly for soft wood cuttings taken into the greenhouse during the winter and spring for winter and spring grafting, and for the sowing of some seeds.

The idea of closing in the bed overhead is to control the air and sunlight, as fresh cuttings and grafts lose much by respiration in the daytime. The bed may be aired at night when there is less respiration, which helps also to harden the cuttings as they become rooted; a very important factor.

If the cutting has opposite leaves cut it off at a joint and it will root there or thereabouts. If the cutting has alternate leaves like the Heliotrope cut it anywhere, and it will root anywhere along the stem. Some leaves should be taken off to reduce respiration. What there is to know is what is the proper condition of the wood and the conditions under which cuttings will root. This can be learned only by experience. It is a hard thing to explain as no two gardeners have the same conditions, nor is their experience just the same.

It will be safe to make the sand quite firm, the cuttings quite firm in the bed, and in giving them plenty of water and shade from

sunlight for the first few days. As they root less water and less shade will be required. The best time to root soft wood cuttings is in the spring as the conditions can be more easily controlled.

In this way can be rooted all greenhouse stock such as Heliotrope, Carnations, Stevia, Salvia, soft wood cuttings of Roses, Lantanas, Fuchsias, Abutilon, Geraniums, leaf cuttings of Begonias, growing cuttings of Azaleas, Heaths, Acacias, Cytisus, and some varieties of Antirrhinums and Ageratums.

At this time Lilacs, Deutzias, Spiraeas, Philadelphus, and other spring-flowering shrubs, when forced under glass, afford means of propagating these plants from soft cuttings. This fact is often taken advantage of by nurserymen with rare shrubs, *Daphne cneorum,* for one, to force the plants under glass for cuttings, and root them in the spring. It is often the best way.

In general practice, however, many tree and shrub cuttings are rooted from half-ripened wood taken from outdoors during the summer. For these the propagating bed may be used without bottom heat, though it is sometimes done in a cool greenhouse in flats, and may be done in a cold frame.

This is a good way to root, in addition to those previously mentioned, Evergreen Azaleas, Viburnums, Cotoneasters, Forsythias, Ligustrums, Catalpas, Lonicera, Symphoricarpos, and some Roses taken with a heel. All spring-rooted cuttings should be potted at once. Shrub and tree cuttings, rooted after midsummer, are often left where rooted until spring.

With many of the trees and shrubs there is another chance, and that is by hard wood cuttings taken after the leaves fall. The nursery practice is, for such as Lilacs, Deutzias, Spiraeas, and many others given in the previous lists, to make cuttings in the autumn, tie them in bundles, and store them in moist soil or sand until spring. During the winter they will form a callus or root-bearing surface. They should be planted out in spring and a fair percentage of them will root during the summer.

Many trees and shrubs may be propagated from root cuttings, more than is generally supposed. The practice is to cut up roots and store them in flats of sandy soil over the winter. This may be done with the Quince, Ailanthus, Cladrastis, Eleagnus, Fothergilla, Elms, Prunus, Wistarias, and some Roses (*R. lucida, R.*

rugosa, R. cinnamomea, and *R. alpina*). Some of these root cuttings, especially the trees, will take two years to make plants. This is a common practice with the Japanese Anemone and some greenhouse plants such as Dieffenbachia, Dracaena, and Bouvardia.

Cuttings of evergreen trees and shrubs, mostly coniferous plants, are put in during the autumn and kept over in a cool greenhouse or cold frame. The same thing is done with Cotoneasters, Euonymus, and Buxus. They scarcely do more than callous during the winter. A fair percentage may be expected to root during the following spring and summer, but some Junipers, Torreyas, and Taxus may lay over another year. Those that root may be planted in the spring, but it is customary to keep them in flats until established as the roots of some are very brittle, especially the Yews and Torreyas.

It is best to root all the forms and variations from the type from cuttings, especially the foliage forms of conifers, as they are surer of retaining their varietal character than when grafted. Ordinarily the juvenile forms of Thuya, Juniper, and Chamaecyparis, with acicular whorled leaves, give way in a few years to the adpressed adult form and sometimes quite extreme forms. If, however, these juvenile and other forms are rooted from cuttings they will very likely retain their individuality during the lifetime of the plant. In this way many peculiar forms of conifers have been established and are now in cultivation, but if grafted they are liable to take on the adult form or revert sometime or other, either wholly or in part. The dimorphic character of many conifers makes it difficult to fix these variations with any degree of certainty and they sometimes break away. The Red Cedar, as before stated, has at first acicular juvenile leaves and later adpressed, scale-like adult leaves. Now if it is pruned or gets injured the first new leaves that appear are juvenile and it does not resume the adult form for two or three years, starting life over again, after a setback, so to speak.

It takes less time to flower a plant from a cutting or graft than from a seed and at less stature. This fact is often taken advantage of to dwarf stock. A cutting of the well-known Poinsettia if taken in spring and grown will sometimes reach a height of six feet before flowering, but if a cutting is taken in July it will flower at one-third

this height or less. It is a common practice to take cuttings of flower stems of *Crassula coccinea* and bloom them when a few inches high, and the same can be done with *Sedum spectabile.* The ordinary garden Phlox can be rooted from cuttings and grown as a pot plant and has considerable decorative value. Chrysanthemums can be bloomed down to a foot high, depending on when the cuttings are rooted.

Drop a leaf of a Rex Begonia on the sand of the propagating bed and it will root at almost every leaf fork. This suggestion has been taken advantage of by growers of the famous Begonia Gloire de Lorraine and now stock of this is raised almost exclusively in this way.

By leaf cuttings is often the only way to fix a sport. Sports as they occur in Chrysanthemums and Carnations mean a change in the color of the flower, sometimes half and half. Generally the sporting does not extend to the whole shoot and shoots below a certain point produce normal flowers, so to fix a sport it must be done from the shoot that produces it. Sometimes one is limited to leaf eyes which generally root quite easily and so the sport is fixed. The plants obtained will produce rootstocks the following autumn from which can be got a plentiful supply of cuttings. Rose sports can be treated in the same way, although grafting and budding may be practised with these.

In fixing Carnation sports it is necessary to go through much the same experience. A cutting or two may be obtained from the shoot that produces the sport, but in order to obtain a greater increase resort must be had to leaf eyes. As, however, all sports are bud variations still other sports are liable which has been known to happen.

Propagation of any particular plant means the perpetuation of that plant in another individual. Every new plant raised in this way is a part of the original and just as old; it is the same plant. In connection with this fact it is not unusual when a Carnation gets ready to sport it sports in several places at the same time. So well known is this fact by judges that whenever a sport is put before them for certification the award, if considered, is generally witheld until it is found if the sport has appeared elsewhere.

Layering.

Layering is very much nature's way. She does it quite openly. To get a plant on its own roots is a very good way and in some cases, if not the only way, it is the best and most practical way. Rhododendrons cannot very well be rooted from cuttings. I do not say it is impossible, for what one cannot do another may, but for most people it is impracticable to root Rhododendrons from cuttings. They can be layered though it may take two years to do it. Layering for Rhododendrons is in my opinion best for this country and in the opinion of one noted grower best for any country.

In foreign countries the most easily workable stock for grafting Rhododendrons is Ponticum, a plant of uncertain hardiness in itself here. It is well enough to use it for a stock if grafted low enough so that the cion gets on its own roots, but uncertain and short-lived as a stock. The result is when we import Rhododendrons unless we get layered plants we get something not dependable.

As a rule plants that will not layer are difficult to root from cuttings. I have never seen Pines, Hemlocks, or Firs layer naturally, or even artificially, nor have I been able to root them from cuttings. As I said before nature often shows the way and we frequently find Hydrangeas, Loniceras, Deutzias, Forsythias, Viburnums, Currants, Gooseberries, and Grape vines rooting wherever they happen to strike the ground. With this hint man goes nature one better by making cuts in the stem, bending the branch to the soil and covering it with prepared loam.

Formerly Carnations were rooted mostly by layering. We had not become acquainted with the expeditious methods now in use in this country where they are rooted by tens of thousands from cuttings.

Grafting.

Grafting has been said by one notable authority to be a makeshift at best. I will not venture to disagree with that authority. It is a valuable makeshift nevertheless. In this, as in all other methods of propagation, nature has shown the way and examples of natural

grafting, while not common, are still common enough to have come within the observation of most gardeners and others interested in horticulture. With few exceptions plants would prefer to be on their own roots and they make strenuous efforts to get there if given a chance.

Nevertheless, grafting is indispensable and few processes have added more to the material welfare of mankind. We would be in a poor way for Apples, Plums, Peaches, Pears, and Apricots, not forgetting Lemons and Oranges, if we had to depend on other methods.

There are various methods of grafting and budding but both depend on one thing and that is the union of the cambium layers of stock and cion. The cambium layer lies between the bark and the wood. It is here all annual growth is made. It is the center of the plant's activities, the life center. A tree may be perfectly hollow and live so long as the cambium is uninjured.

There is one essential that must never be lost sight of and that is the stock and cion must be in about the same state of activity, probably better if the stock is a little ahead of the cion. Even though they be dormant both should be evenly matched when working them.

For indoor grafting the roots of the stock must be active, even though the plant has otherwise made little growth. It is well, too, that the cions be brought in a little time before being worked so as to get some life into them.

As to which method is adopted depends on the time of the year, the kind of plant, the condition of the stock and cion, and the object in view. Whatever is done it will take time and experience to succeed. Indoor grafts, excepting conifers, may be waxed over, tied up in bundles, and packed away in sphagnum moss until united. Outdoor grafting should be done in springtime well near the ground level and earthed up. There will be no need to wax them over. Dormant stock grafted indoors in winter may be stored in moist soil or sand until the time comes for planting them out.

Generally one must graft like on like, though there are exceptions, for we are not limited to the same species or even genus. Some plants are increased in vigor by the use of a stronger-growing species or variety for a stock, and the reverse may happen.

No better illustration of the effect of stock on cion could be given than the Rose. Most Roses could be easily got on their own roots by cuttings or layers. Tea and Hybrid Tea Roses grafted or budded on the Manetti attain more vigor than when on their own roots and this is the universal practice now. Roses grafted or budded on the English Briar, which has a distinct period of winter rest, do not force as well as when on the Manetti, which grows more or less all the time. On the contrary Roses on the Briar are better for outdoor planting.

The Paradise Apple stock is used for dwarfing Apples. For dwarfing Pears a different genus, Cydonia, is used. Although the Apple and Pear belong to the same genus they cannot be successfully grafted on each other.

The Hawthorn evidently has an unusual affinity with several members of the pomifera or Apple group. Pears, Cotoneasters, and Mespilus can be grafted on it, all different genera. From a shoot near the union between the Hawthorn and the Mespilus has arisen what is known as a graft hybrid, named Crataego-Mespilus, intermediate in character between both parents. Cytisus can be grafted on Caragana, Lilacs on Privet, and there are other anomalous cases. Plums may be grafted on Peaches and Peaches on Plums. For light soils and in the South Peach stock is preferred. For heavier soils and in the North Plum stock is preferred. European Peaches and Plums may be grafted on the native *Prunus americana* stock.

The cions of dwarf stocks should be kept above ground. When planted there is a chance that the annual layers of growth may overlap and eventually reaching the ground and rooting may put the plant on its own roots and the dwarfing lost. This happened on an estate not far from Boston where the fillers, dwarfs or supposed to be, got on their own roots and their value as such lost. Attaining normal size they crowded the permanent trees and had to be cut out prematurely.

Grape vines are nearly always raised from cuttings or layers. The youngest plant being a part of the parent is just as old. It has been on its own roots all the time. Varieties on their own roots show no constitutional variation. The Black Hamburg Grape is the same the world over, now as ever.

It is not so with grafted plants. There are variations even in the Baldwin Apple. Go to our fruit shows and it will be hard to find two dishes of Baldwin Apples that look alike. The fact is the Baldwin Apple has sported and to standardize that or any particular sport it will have to be fixed and the best way to do that is to get it on its own roots. Propagators will use the best form or variety for grafting and still get sports. No reliance can be placed on any as long as mixed seedling Apple stocks are used. Something has been done by root grafting to get Apples on their own roots. It does not appear, however, that this was what the operators had in view, but rather economy in operation. It is a cheap and easy way, but there is a very good chance that cions will get on their own roots when root grafted.

Division.

The division method of propagation should be easily comprehended. It is applied mostly to herbaceous or hardy border plants and some greenhouse plants. It is best done when the plants are at rest. It is also the general practice with Ferns, excepting some Tree Ferns, in which case one must depend on spores which will be described further on.

Seeds.

One does not have to look far for evidence of the seed method in the propagation of plants. It is to be seen everywhere. To reproduce itself is the last expiring effort of all plant life when it comes to this. The annual does it in one year, the biennial in two. When an old Black Spruce or Pitch Pine is seen loaded with cones it is getting ready to die. I have known Peach trees make an unusual floral display, set a big crop of fruit, and die before bringing it to maturity. It is often stated that Peach trees are short-lived. The probability is that they had been allowed to carry too much fruit.

When a cutting, layer, or graft is started the parent is reproduced but when a seed is started a new individual is created. Seedlings

have an individualism not possessed by cuttings or layers. A counterpart of the parent may be reproduced or something new is liable to happen. In the one way it is known what to expect, in the other it is uncertain, and therein lies the fascination of growing plants from seed. A man with a thousand Carnation seedlings about to bloom is on tiptoe all the time.

Some of the variations of seedlings in color or form can by selection and improvement be fixed so that they can be relied upon and will come true from seed. These are called strains. Among the strains of flower seeds that come true to color are Cosmos, Antirrhinums, China Asters, Balsams, Canterbury Bells, Cyclamen, Primulas, Gloxinias, Dianthus, Hollyhocks, Petunias, *Phlox Drummondi*, Poppies, Salvia, Stocks, Sweet Peas, and many others.

It is not expected, however, that forms or foliage variations can be fixed in seeds. They generally revert to the type, but there are cases where forms have become fixed from seed. For example, *Tsuga macrophylla*, a form of *Tsuga canadensis*, holds its form in seed. So do Wiers Cut-leaved Maple, Purple Beach, Golden Spiraea, the purple leaved Japanese Maple, and the purple leaved Barberry. A fair percentage of all these come true. The probability is that all these were seed variations in the first place rather than sports.

The subject of the acclimatization of plants from seed is an interesting one. It is going on all the time by natural as well as artificial means. What nature has taken ages to do man may do in a lifetime. The Japanese Clematis was tender when first introduced, but after a generation of seedlings it proved perfectly hardy. The Irish Yew, an imported plant, is not hardy here, but its seedlings are perfectly hardy. They have been left out without any protection since six inches high.

For seeds sown in springtime underglass, having a short period of germination it is customary to use seed boxes (12 + 16 + 2). They are easy to handle and to take care of in the matter of water and besides do not permit an over abundance of material. Good light loam is best for most seeds. It should be made firm and marked out for seeds big enough to see easily. It is hardly necessary to cover the seeds, merely give the box a shake. Very fine seeds such as Begonia, Gloxinia, and Streptocarpus should be sown

broadcast, first covering the soil with a sprinkling of sphagnum moss. This makes an excellent germinating medium and should be tried wherever there is difficulty in germination.

We divide our seeds into batches, one for indoors and one for outdoors. The indoor batch includes all greenhouse plants such as Grevillias, Dracaenas, Gloxinias, Begonias, and Primulas. We also sow some tender annuals indoors such as Asters, Salvias, Penstemons, Ageratums, Lobelias, Zinnias, and border Antirrhinums, and such as we want early, and all fine seeds of hardy annuals that would be lost if sown in the open.

Hardy annuals and some perennials are sown outdoors in late April or May such as Agrostemma, Alyssum, Candytuft, *Gypsophila elegans,* Larkspurs, Four o'clocks, Calliopsis, Indian Pinks, Lupines, Sweet Sultans, Mignonette, Marigolds, *Phlox Drummondi,* Poppies, Sunflowers, and Sweet Peas. Biennials and some plants wanted for spring bedding such as Pansies, Violas, Myosotis, Foxgloves, Canterbury Bells, and Sweet Williams are sown about midsummer. Also autumn blooming greenhouse plants such as Calceolarias, Schizanthus, and Cinerarias.

There is more trouble with seeds sown indoors than out. Abundance of light and air as the seedlings come up will do much to ward off the various fungoid diseases that attack young plants. The same soil and conditions with regard to ventilation and shade will not do for all. Generally as seeds germinate they are to be shifted to cooler quarters to harden them off. The seedlings must be pricked off as soon as large enough to handle. With outdoor seeds all that is necessary is to see that they have plenty of water.

We frequently find seedlings of berried and fruit-bearing plants growing where the seeds have been dropped by birds. It is, therefore, quite natural to consider fruit to be eaten first in the natural distribution of plants by birds. So if berried seeds are to be sown as soon as ripe it will be better to wash them out in order to simulate this natural process, though sometimes when seeds are stratified, a process described further on, the natural process of decay does practically the same thing.

We are accustomed to expect seeds to germinate in a month or two. The majority do but many tree and shrub seeds do not and some must go through a period of freezing to have them germinate.

This is the case with most hard-coated seeds. If one does not know how long it takes seeds to germinate it is well to hold over the seed boxes for at least one year. Many seeds lose their vitality if kept dry for any length of time. If it does not matter when seeds germinate so long as they do so it is just as well to sow them as soon as ripe. It may explain some previous failures and it sometimes happens that a year's time is gained.

The Japanese Barberry, if held over and the seeds get dry, they are likely or the greater part of them, to lay over still another year, and the same with Rose seeds; but if sown in the open with merely a cover of litter added to keep them from being thrown on the surface by frost, otherwise called "heaving," about all of them will be up in spring. This is where freezing helps.

When it is known how long it takes for seeds to germinate the time can be regulated. Some tree and shrub seeds germinate within a few weeks, sometimes in a few days, after sowing and these seeds can be held from autumn until spring. Most Pines, Spruces, Firs, Thuyas, and Chamaecyparis may be sown in spring and come up soon afterwards. Elms ripen early in the spring and come up in early summer. Some shrub seeds such as Deutzias, Spiraeas, Lilacs, Buddleias, and Philadelphus also come up quickly. *Buddleia variabilis,* known as the Summer Lilac, sown indoors last March, grew six feet before September, with flower stems four feet long. This achievement certainly puts this handsome Chinese sub-shrub in an impressive light.

As a rule berried and nut seeds lay over a year. Some of them as soon as ripe, and some as in the case of *Cotoneaster Dielsiana* and *Magnolia stellata,* may come up the following spring, or only a part of them may germinate; or they can be stratified until spring, one or two years as need be, which means that the seeds may be laid away in moist earth or sand and sown when it is expected they will germinate. This is done by nurserymen and others who value space.

I prefer to sow seeds that lay over as soon as ripe. Some will come up the first year and first year seedlings are usually the strongest and are worth taking note of by the plant breeder. Gardeners generally are agreed that the first seedlings of florists' flowers are usually the strongest and also the poorest in floral quality and

they always are very careful to save the later and weaker ones. If they are looking for double flowers or fine colors they are surer of getting them among these. Among Rhododendrons the first in a batch to bloom are always the strongest growers and the poorest in flower.

The list of berried and nut seeds that may be sown in the autumn or stratified is a large one. I give only a few: of tree seeds, Oaks, Chestnuts, Walnuts, Beech, some Pines, Yews, Ginkgo, Aesculus, Acer, Fraxinus, Crataegus, some Pyruses, some Prunuses, Liriodendron, Sassafras, and Junipers. Yews, Junipers, and Crataegus sometimes lay over three years; of shrub seeds, some Prunuses, some Pyruses, Cydonia, Lonicera, Rhamnus, some Styrax, Dirca, Ilex, Ligustrums, Cotoneasters, Fothergilla, Halesia, Hamamelis, Symphoricarpos, and some Roses if the seeds have become dry.

The seed method is applied to Palms and it is the only practical way to propagate them. It is a special industry and very few gardeners raise the Palms they use.

I found Rhododendrons growing wild in mossy places on the Hunnewell Estate at Wellesley and that was a clue to conditions under which I could expect to succeed in germinating them. I naturally thought to simulate these conditions in a cool greenhouse, using moss as a germinating medium. They did not do so well in a cool greenhouse and I later found a warm house better for the germinating period. I now raise and transplant Rhododendrons, Azaleas, Heather, Cornish Heaths, Corsican Heaths, Irish Heaths, and their allies in the same house with seedling Orchids.

I use seed boxes, 12 + 16 + 2, and fill them nearly full with coarsely sifted peat with a little sand mixed in. It is then pressed firmly and about one-sixteenth of an inch of sphagnum moss is sifted on. The boxes are then wet and the seeds scattered without covering.

I have lately extended this plan of seed sowing to all fine seed with excellent results. All gardeners know what "mifty" things Calceolarias are to handle, but sown on sphagnum moss they give no trouble.

The soil is kept quite moist until the seedlings are up, four to six weeks, and then fairly moist. When large enough to handle

they are moved into boxes of the same material and set about one inch apart and kept in the same house until July. After that they go into a cooler house and are well aired and slightly shaded until the middle of September. Then they are exposed to harden until frosty weather and after that housed in frost-proof quarters for the winter, although a little frost would do them no harm.

Gardeners are often asked a question like this, "I have a Begonia. How often shall I water it?" Frankly, that question without the plant at hand is impossible to answer. I usually say "When the plant is dry" which to the inquirer is no answer at all. To most people it would mean when the plant is dust dry and sometimes that would be all right for a Geranium, a Tuberous Rooted Begonia, or a Gloxinia going to rest.

To know when seed boxes want water is just as hard to tell. There is a good deal of intuition in this as in much other garden work. It is not always necessary to look at the surface of the soil; it is one indication, but may be a false one. If one has cared for a lot of seed boxes from the beginning and knows the condition it might be said consistency of the soil, the kind of atmosphere, bright or shaded, will indicate to him how often seeds want water, independent of surface conditions. Sometimes a finger pressed into the soil or the weight of the box will indicate that.

Small seeds, as has been shown, are barely covered and sometimes not at all. In such cases the surface must be kept moist. To let it dry for a day or bright sunshine strike it for an hour would be fatal for the seedlings.

Spores.

The spore method belongs to Ferns. Their reproductive method is entirely different from that of flowering plants. Spores are found generally on the back of the leaves, sometimes on special leaves or fronds as they are called. Falling on the ground or any suitably moist place they form a kidney-shaped patch of green like a small leaf from which is developed a new plant.

TAMING THE WILD BLUEBERRY.[1]

By Frederick V. Coville, Washington, D. C.

Delivered before the Society, with stereopticon illustrations, March 11, 1916.

[The substance of this lecture is contained in Bulletin No. 334, United States Department of Agriculture, entitled Directions for Blueberry Culture, 1916. By Frederick V. Coville, Botanist. It is here reprinted by permission with change of paging and omission of plates.]

Special Requirements.

Success in blueberry culture rests especially on the recognition of two peculiarities in the nutrition of these plants: (1) Their requirement of an acid soil; (2) their possession of a root fungus that appears to have the beneficial function of supplying them with nitrogen.[2]

If blueberries are planted in a soil with an alkaline or neutral reaction, such as the ordinary rich garden or fertile field, it is useless to expect their successful growth. In such a situation they become feeble and finally die. Blueberries require an acid soil, and they thrive best in that particular type of acid soil which consists of a mixture of sand and peat.

Good aeration of the soil is another essential. It is commonly but erroneously supposed that the swamp blueberry (*Vaccinium corymbosum*), the species chiefly desirable for cultivation, grows best in a permanently wet soil. It is to be observed, however, that the wild plants of the swamps occupy situations which, though

[1] Revised by the author from the original paper of 1913, entitled "Directions for Blueberry Culture," which was published, without illustrations, as pages 3 to 11 of Circular 122, Bureau of Plant Industry, and was also separately printed.

[2] For a full discussion of the principles of blueberry culture, including the soil requirements and peculiarities of nutrition of the blueberry plant and the details of the growing of seedlings, consult "Experiments in Blueberry Culture," Bulletin 193, Bureau of Plant Industry, 1910, or the corrected reprint of 1911. Although the edition of this bulletin was long since exhausted at the Department of Agriculture, copies may be obtained from the Superintendent of Documents, Government Printing Office, for 25 cents each.

perhaps submerged in winter and spring, are exposed to the air during the root-forming period of summer and autumn or, when growing in permanently submerged places, they build up a hummock or a cushion of moss which rises above the summer water level and within which the feeding roots of the bush are closely interlaced. In actual culture, moreover, it has been found that the swamp blueberry does not thrive in a permanently wet or soggy soil.

Although some species of Vaccinium, such as the common lowbush blueberry of the northeastern United States, *V. angustifolium* (called V. *pennsylvanicum* by some authors), grow and fruit abundantly in sandy uplands that are subject to drought, the swamp blueberry grows best in soils naturally or artificially supplied with adequate moisture.

These, then, are the three fundamental requirements of successful blueberry culture: (1) An acid soil, especially one composed of peat and sand; (2) good drainage and thorough aeration of the surface soil; and (3) permanent but moderate soil moisture. Under such conditions the beneficial root fungus which is believed to be essential to the nutrition of the plant need give the cultivator no concern, for even if the necessary fungus were wholly lacking in the soil of the new plantation each healthy bush set out in it would bring its own supply of soil-inoculation material.

Next in importance to soil conditions is a convenient location with reference to a good market. The berries should reach their destination without delay, preferably early in the morning following the day of picking. To secure the best prices they should also reach the market about the beginning of the main wild-blueberry season. A situation to the south of the great areas of wild blueberries in northern New England, Canada, and northern Michigan is therefore desirable. One of the most promising districts for blueberry culture is the cranberry region of New Jersey, for there an ideal soil occurs in conjunction with an early maturing season and excellent shipping facilities to the markets of Philadelphia, New York, and Boston.

Situations liable to late spring freezes, such as the bottoms of valleys, should be avoided, for while the blueberry plant itself is seldom injured by freezing, its crop of fruit is often destroyed in this way.

In seasons in which the wild crop of upland blueberries has been destroyed by late spring freezes, it has been observed that in or around bodies of water, such as cranberry reservoirs or cranberry bogs temporarily flooded to prevent frost or insect injury, the wild bushes often produce normal crops of blueberries. It may be found that provisions for flooding blueberry plantations will save a crop often enough to warrant the installation of flooding equipment. In locating a blueberry plantation, therefore, it would be well to choose a situation that could be flooded, if flooding proved later to be commercially advantageous.

Importance of Superior Varieties.

In the southern United States and in the Middle West blueberries are not ordinarily distinguished from huckleberries, but in New England the distinction is very clearly drawn. The name huckleberry is there restricted to plants of the genus Gaylussacia, the berries of which contain 10 large seeds with bony coverings like minute peach pits, which crackle between the teeth. The name blueberry is applied in New England to the various species of the genus Vaccinium, in which the seeds, though numerous, are so small that they are not noticeable when the berries are eaten. It is probable that the comparatively low estimation in which this fruit is held in the South is largely due to the lack of a distinctive popular name and the consequent confusion of the delicious small-seeded southern Vacciniums with the coarse large-seeded Gaylussacias. It is the culture of the small-seeded blueberries only, as distinguished from the large-seeded huckleberries, that is here advocated.

From the market standpoint, the features of superiority in a blueberry are sweetness and excellence of flavor; large size; light-blue color, due to the presence of a dense bloom over the dark-purple or almost black skin; "dryness," or freedom from superficial moisture, especially the fermenting juice of broken berries; and plumpness, that is, freedom from the withered or wrinkled appearance that the berries begin to acquire several days after picking. Large berries cost less to pick than small ones and bring a higher price. A berry

eleven-sixteenths of an inch in diameter has already been produced under field culture, and others of still larger size are to be expected.

Although blueberry plantations may be formed by the transplanting of unselected wild bushes or by the growing of chance seedlings, neither of these courses is advocated, because neither would result in the production of fruit of an especially superior quality. Seedling plants, even from the largest berried wild parents, produce small berries as often as large ones. Until nurserymen are prepared to furnish plants asexually propagated from superior stocks, the cultivator should begin by the transplanting of the best wild bushes, selected when in fruit for the size, color, flavor, and earliness of the berry and the vigor and productiveness of the bush. These he should propagate by layering and by cuttings until his plantation is completed. Through a combination of these methods, a valuable old plant can be multiplied by several hundred at one propagation, the fruit of the progeny retaining all the characteristics of the parent.

Propagation.

While grafting and especially budding are useful in experimental work, neither method is suitable for commercial plantations, because blueberry bushes are continually sending up new and undesirable shoots from the stock. The best season for budding for experimental purposes is from the middle of July to the end of August. The ordinary method of shield budding, with dry and unwaxed raffia wrapping, has proved the most successful of all the methods tried. The best wood on which to bud is the lower portion of vigorous basal shoots of the season, especially those from plants that were cut to the stump in the preceding winter. On such shoots the bark can be lifted with ease much later in the season than on older stems. Special care must be taken that the raffia wrapping does not become wet and fermentation ensue between the raw surfaces of bud and stock, in the first three weeks. By that time, in normal cases, the bud wood has united with the stock, and if the budded stem has increased in diameter sufficiently to cause pronounced choking by the raffia the wrapping should be removed. If choking does not occur the wrapping may be allowed to remain until spring, when the stem

is cut off above the still dormant bud. In greenhouse experiments, a growth of over 8 feet has been secured from an inserted bud in its first growing season, all other growth from the stock having been promptly rubbed off as soon as it started.

Stumping.

The easiest way to propagate the swamp blueberry is by a special process of layering named "stumping." The directions are as follows:

1. In late fall, winter, or spring, preferably in early spring before the buds have begun to push, cut off at the surface of the ground either the whole of the plant or as many of the stems as it is desired to devote to this method of propagation. The stems that are cut off are discarded, or they may be used for cuttings, as described under "Tubering" or "Winter cuttings."
2. Cover the stumps to the depth of 2 to 3 inches with a mixture of clean sand and sifted peat, 2 to 4 parts of sand to 1 of peat, by bulk. A rough box or frame may be built on the ground to keep the sand bed in place.
3. Care must be taken that the sand bed be not allowed to become dry except at the surface during the summer.
4. The new growth from the stumps, which without the sand would consist of stems merely, is transformed in working its way through the sand bed into scaly, erect, or nearly erect rootstocks which, on reaching the surface of the sand, continue their development into leafy shoots. Although roots are formed only sparingly on the covered bases of stems, they develop abundantly during spring and early summer on these artificially produced rootstocks, and by the end of autumn all the shoots should be well rooted at the base. They should remain in place in the sand bed till late winter or early spring, undisturbed and exposed to outdoor freezing temperatures; but the sand should be mulched with leaves, preferably those of red oaks.
5. Early in the following spring, before the buds have begun to push, open the bed and sever each rooted shoot carefully from the stump. Discard the upper portion of the shoot, making the cut at such a point as to leave on the basal portion about three buds above the former level of the sand bed. If the cut at the basal end of the rooted shoot is not smooth or the wood is cracked, recut the surface with a sharp thin-bladed knife. The discarded upper portion of the shoot may be used for winter cuttings, as described on pages 112 to 115.
6. Set the rooted shoots in a coldframe or a cool greenhouse in clean

earthenware pots of suitable size, ordinarily 3-inch pots, in a soil mixture consisting of two parts, by bulk, of rotted upland peat and one part of sand.

7. Cover the frame with muslin or other white shade suspended above the glass, giving the plants plenty of light but no direct sunlight, and for the first two or three months keep the temperature at not to exceed 65° F. if practicable. When subjected to high temperatures the newly cut shoots are liable to die and rot from the base upward. The outer surface of the pots should never be allowed to become dry. The desired condition may be assured by bedding, or "plunging," the pots in moist sand up to the rim.

8. Watering should be as infrequent as practicable, only sufficient to keep the soil moist but well aerated.

9. The frame should receive ventilation, but not enough to cause the new twigs to droop. These are most susceptible to overventilation and to overheating when they have nearly completed their growth.

10. After the new twigs have stopped growing and their wood becomes hard new root growth takes place. Then secondary root growth follows, either from the apex of the new twigs or from another bud lower down on the old wood of the original rooted shoot. Until this secondary twig growth takes place the life of the plant is not assured.

11. Those plants that make sufficient growth to require repotting during the first summer should be set in clean pots of 2 inches larger diameter in a standard blueberry-soil mixture.

Soil mixture for Blueberries.

A very successful potting mixture or nursery-bed mixture for blueberry plants consists of one part of clean or washed sand, nine parts of rotted upland peat, either chopped or rubbed through a sieve, and three parts of clean, broken crocks, that is, pieces of ordinary unglazed, porous, earthenware flower pots. No loam, and especially no lime, should be used. Manure is not necessary, and in the present state of our knowledge may be regarded as dangerous, although in small quantities it serves to stimulate the plants, at least temporarily. The danger from manure apparently lies in its tendency to injure the beneficial root fungus of the blueberry plant.

The use of broken crocks in the potting mixture is based on the fact that the rootlets seek them and form around them the same kind of mats that they form at the wall of the pot, thus increasing the effective root surface and the vigor of growth. If crocks are not available, the soil mixture should consist of 2 to 4 parts of peat to 1 part of sand.

The peat most successfully used for potting blueberry plants is an upland peat procured in kalmia, or laurel, thickets. In a sandy soil in which the leaves of these bushes and of the oak trees with which they usually grow have accumulated and rotted for many years, untouched by fire, a mass of rich leaf peat is formed, interlaced by the superficial rootlets of the oak and laurel into tough mats or turfs, commonly 2 to 4 inches in thickness. These turfs, ripped from the ground and rotted from two to six months in a moist but well-aerated stack, make an ideal blueberry peat. A good substitute is found in similar turfs formed in sandy oak woods having an underbrush of ericaceous plants other than laurel. The turfs of low-bush blueberries serve the same purpose admirably. Oak leaves raked, stacked, and rotted for about 18 months without lime or manure are also good. The leaves of some trees, such as maples, rot so rapidly that within a year they may have passed from the acid condition necessary for the formation of good peat to the alkaline stage of decomposition, which is fatal to blueberry plants. Even oak leaves rotted for several years become alkaline if they are protected from the addition of new leaves bearing fresh charges of acidity.[1] The much decomposed peat in the submerged lower layers of deep bogs, such as is used for fuel in Europe, is not suitable for blueberry-soil mixtures.

Tubering.

By ordinary methods, cuttings of the swamp blueberry have been rooted only in occasional instances. Successful special methods, however, have now been devised for these plants. Wild stocks of the swamp blueberry vary greatly in their response to propagation by a particular method, and it is likely to prove true that one variety of cultivated blueberry can best be propagated by one of the methods here described, others by another. The most novel of the methods devised, but the one easiest of operation, is that of tubering. This method involves the same principle as that em-

[1] For a fuller discussion of the conditions under which leaves decompose into leaf peat as distinguished from leaf mold, and the fundamentally different effect of the two on the growth of plants, consult "The Formation of Leafmold," Smithsonian Report for 1913, pp. 333 to 343 (also separately printed).

ployed in stumping, namely, the forcing of new shoots in such a manner that their basal portions are morphologically scaly root-stocks, with a strong rooting tendency. The directions for tubering as applied to the swamp blueberry are as follows:

1. Make stem cuttings from outdoor plants between midwinter and early spring, before the buds have begun to make their spring growth, and preferably on a warm day when the twigs are not frozen. A still better plan is to make the cuttings in autumn after the leaves have fallen, and store them for about two months in moist sphagnum moss on ice at a temperature just above freezing.

2. The cuttings are to be made from vigorous plants grown in well-lighted situations and with stems therefore well stored with starch. Use unbranched portions of the old and hardened branches and stems, about a quarter of an inch to an inch, or even more, in diameter. From 3 to 4 inches is a suitable and convenient length. Make the cuts with pruning shears or a fine-toothed saw and remove the bruised wood at the cut ends with a sharp knife. Be careful not to injure the bark or split or strain the wood.

3. Lay the cuttings horizontally in a shallow box or other cutting bed of pure clean sand and cover them to the depth of about half an inch. Moisten the sand well with rain water, bog water, or other pure water (free from lime) from a sprinkling pot, and see that the sand is closely and firmly packed about the cuttings. Cover the box or cutting bed with a pane or panes of glass, the top of the box being flat, so that the glass fits it rather snugly. The box should be so prepared that any surplus water in the sand will drain away beneath through holes in the bottom covered with clean broken crocks and sphagnum moss.

4. Keep the box at a temperature of 55° to 65° F., or as near those limits as practicable. A temperature of 70° or over is likely to ruin the cuttings.

5. In order to avoid excessive temperatures, do not allow direct sunlight upon the glass, either keeping the box by north light or keeping it shaded, as by a white cloth or paper cover suspended several inches above the glass, or in a shaded greenhouse.

6. Keep the air inside the box saturated with moisture. This condition will be evidenced by the condensation of the moisture on the under side of the glass during the cooler part of the day or whenever a cold wind blows against the glass.

7. Watering should be as infrequent as practicable, only sufficient to keep the sand moist but well aerated and the atmosphere in the box saturated. If the glass fits tightly, a second watering may not be needed for several weeks.

8. Within a few weeks new growth will begin to appear above the sand. When the shoots have reached a length proportionate to their vigor, com-

monly 1 to 3 inches, their further growth is self-terminated by the death of the tip. After the leaves have reached their full size and acquired the dark-green color of maturity the time has come for the development of roots.

9. When the first shoot has reached this rooting stage a half-inch layer of finely sifted rotted peat, 2 parts, and clean sand, 1 part, should be placed on the surface of the cutting bed and moistened well with water. A time-saving and perhaps desirable modification of this treatment is to use this mixture of peat and sand as the original covering of the cuttings, described in paragraph 3.

10. The new growth, which if it had originated above the sand would be like an ordinary shoot, was transformed in working its way through the sand and became a scaly, erect rootstock, which on reaching the surface of the sand continued its development into a leafy shoot. During the spring and early summer, roots form in abundance on the lower or rootstock portion of these shoots.

11. After a shoot is well rooted it commonly, though not invariably makes secondary twig growth the same season, usually from a bud in the axil of the uppermost leaf. If the rooting of the shoot has not already been ascertained by direct examination, the making of such secondary growth is good evidence that rooting has actually taken place.

12. When a shoot is well rooted, with roots 1 to 2 inches in length, it is ready to be potted. If the shoot has not already disconnected itself from the dead cutting, it should be carefully severed with a sharp knife. In the process of tubering, the behavior of the cuttings is essentially identical with that of real tubers, like those of the potato. The original cutting dies, but the sprouts that arose from it root at the base and form independent plants.

13. The rooted shoots should be potted in clean 2-inch earthenware pots in the standard blueberry-soil mixture already described.

14. The pots should be bedded in moist sand up to the rim in a glass-covered frame or box, well lighted but protected from direct sunlight, and slightly ventilated but with a saturated or nearly saturated atmosphere.

15. In order to secure rapid growth, the rooted plants should be gradually accustomed to a well-ventilated atmosphere and then to half sunlight, this adjustment extending over a period of about three to four weeks.

16. If preferred, the rooted shoots may remain in the original cutting bed until the following spring, the cutting bed being exposed during the winter to freezing temperatures, but mulched with oak leaves, and the plants may then be transferred, with their whole root mat intact, to a peat and sand nursery bed at a spacing of about a foot each way.

Where propagating is to be done on a sufficiently large scale, outdoor coldframes may be used instead of cutting boxes. Miss Elizabeth C. White, of New Lisbon, N. J., who has brought to-

gether the best existing collection of selected wild-blueberry stocks, has been propagating them with much success in muslin-shaded coldframes by the method of tubering, and she has much simplified the handling of the cuttings, both before and after rooting. The cuttings are made in the late fall, packed in boxes in loose, moist, clean sphagnum moss, and stored during the winter in a cool cranberry house at a temperature of about 40° F. As soon as the frost is out of the ground beds of clean sand are laid down in the coldframes and the cuttings are pressed into the sand until the upper side is level with the surface. The whole is then covered with an inch layer of sifted peat (about 2 parts) and sand (1 part). The frames are completely shaded by muslin on a framework about 7 feet above the ground, and ventilation is not begun until most of the shoots are rooted, about midsummer. The shades and sash are removed in early October, and in late autumn, after most of their leaves have fallen, the rooted plants are taken out of the frames, so that these can be made ready for a new lot of cuttings very early the next spring. The stronger of the rooted plants taken out of the frames are set at once in their permanent places in the field plantation. Those less strongly rooted are placed in nursery beds at a spacing of about 10 inches each way, where they remain during the winter and the following growing season.

Winter Cuttings.

The rooting of leafy cuttings of the blueberry in summer is very difficult, because in a temperature above 70° F. the cuttings blacken and die. With the aid of a shaded greenhouse, winter cuttings can be started early enough to make roots before warm weather comes on. Similar results can be secured in coldframes so located, sheltered, and manipulated as to prolong their low temperature as late as possible into the season.

The essentials of a successful coldframe for blueberry propagation are: (1) That it be located on the cool, shaded, north side of a building or in some other situation where it will not receive reflected heat from neighboring structures. (2) The frame must receive an abundance of light but no direct sunlight, a condition

best secured in the case of isolated frames by the use of clean white muslin shades. Frames on the north side of a building will also require shade in early morning and late afternoon from March to September. On sunless days all shades should be removed, so that the cuttings will receive as much light as possible. (3) There should be ample space for the circulation of cool air between the frames and the shade. A shade at the height of about 7 feet from the ground not only allows such circulation but makes it easy to work among the frames. (4) The frames should be kept closed until the cuttings are rooted. This closing not only keeps the air saturated with moisture and prevents the drying of the cuttings, but it also tends to maintain a cool ground temperature within the frame.

When frames are thus located, constructed, and managed, the maximum temperature on sunny days within the frames is often 10 degrees lower than the shade temperature outside, and the period of safety for cuttings that are not yet rooted is greatly prolonged. Low temperatures can be maintained in such coldframes much later in the season than in a greenhouse of the ordinary construction, even though the greenhouse is well shaded and well ventilated.

The use of a greenhouse in which to start the cuttings, followed by the transfer of the cutting boxes to coldframes at the beginning of warm weather, permits an even more prolonged protection of the cuttings than can be secured in either greenhouse or coldframe alone and increases the percentage of rooted plants.

The directions for rooting winter cuttings of the blueberry by the use of a coldframe are as follows:

1. Make the cuttings in late winter before the buds have begun to swell. If more convenient, they may be made in late autumn, after the leaves have fallen, laid rather loosely in clean moist sphagnum in a covered but ventilated box or other package, and stored until early spring on ice at a temperature just above freezing or in commercial cold storage at a temperature of about 35° F., if such storage is available.

2. Make the cuttings from wood of the preceding summer's growth, rejecting such portions as bear the large fat flowering buds. The cuttings are to be made from well-matured unbranched twigs or shoots grown in well-lighted situations, and therefore well stored with starch. Excellent wood for cuttings is afforded by the long stout shoots that grow the first

summer from a blueberry plant that has been pruned to the stump. In the swamp blueberry these have few or no flowering buds and often are 3 to 5 feet in height and a quarter of an inch or more in diameter at the base.

3. About 4 to 5 inches is a suitable length for finished cuttings. A sharp thin-bladed knife should be used. In the finished cutting the upper end of the diagonal cut at the base of the cutting should come just below a sound bud, and the cut at the upper end of the cutting should be about an eighth of an inch above a sound bud. If the cuts are first made with pruning shears, remove with the knife the bruised wood at the cut ends. The diagonal knife cuts should be as short as is practicable without bruising the bark or splitting or straining the wood. Cuttings that have been kept in cold storage should be recut at both ends, so as to present clean surfaces that show no discoloration. In order to avoid infection of the cuttings, the knife must be kept clean. This may be done conveniently by dipping the blade in alcohol and wiping it on a clean towel. The cuttings must not be allowed to become dry. This is easily prevented by laying them in the fold of a clean moist towel.

4. The coldframe may be of the usual form, the top about 1 foot above the surface of the cutting bed at the front and 2 feet at the back, and tightly constructed of material not less than an inch in thickness, with closely fitting sash of the ordinary kind. The cutting bed, 4 inches in depth, should be laid down over a groundwork of gravel or other material that will provide good drainage. On this groundwork place about 1 inch of clean chopped sphagnum moss and over the moss about 3 inches of pure clean sand. Moisten the sand with clean rain water or other pure water (free from lime) from a sprinkling pot.

5. After making deep slits at suitable intervals in the sand with some clean implement, set the cuttings in the slits at a spacing of about 2 to 3 inches each way according to size, the base of the cutting being in the sand a little above the sphagnum, and see that the sand is so closely and firmly packed about the base of the cutting that the cut surface is in contact with the sand, but be careful not to injure the delicate raw tissue at the base of the cutting by pushing forcibly into the sand. Smooth the surface of the bed by a final watering. Cover the frame closely with the sash, so that the air within will be moist.

6. Do not allow the temperature inside the frame to go above 65° F. Prolonged temperatures above 70° are likely to ruin the cuttings. Do not, on the other hand, allow the cutting bed or the cuttings to freeze.

7. Shade the frame with white muslin at a height of 2 to 7 feet above the frame, so as to keep the sunlight off the glass and at the same time to permit a sweep of air between the glass and the shade. The shade should be so arranged as to be removable on cloudy days or at any time when the frame is shaded by other objects.

8. Keep the air inside the box saturated or nearly saturated with moisture. This condition will be shown by the condensation of the moisture on the under side of the glass at night or at other cool portions of the day.

9. Watering should be as infrequent as practicable, only sufficient to keep the sand moist but well aerated and the atmosphere in the box saturated. If the sash fits tightly, the period between necessary waterings may extend over several weeks.

10. After the cuttings have callused at the base, the new twigs have pushed from the upper buds and their growth has been terminated by the browning of the tips, and the new leaves have reached their full size and acquired the dark-green color of maturity, when the formation of roots is about to begin, the surface of the bed is to be mulched with about half an inch of a mixture of sifted peat, 2 parts, and clean sand, 1 part, carefully watered after application, so that some of the acid water from the peat will be carried down into the sand bed about the base of the cuttings.

11. When all or most of the cuttings in the frame have begun to root, ventilation of the frame should be begun. The best superficial evidence that a cutting has rooted is the development of secondary twig growth, either from the apex of one of the first set of new twigs or from another bud lower down on the old wood of the cutting. If secondary growth does not take place, the development of a plump but dormant bud at the apex of one of the leafy twigs is also good evidence that the cutting has begun to root. Cuttings that are healthy but not yet rooted at the time ventilation begins usually die from excessive transpiration.

12. Ventilation should be only slight at first and should be increased very gradually, the transition to full ventilation extending over a period of several weeks. If any of the sensitive secondary growth begins to wilt, reduce the ventilation immediately until the wilting ceases. Be especially careful not to give too much ventilation on windy days.

13. All cuttings that are dying should be removed from the bed at once. Those injured by too high temperature usually turn brown at the base first, the dead area progressing upward until the new growth collapses. Those otherwise sound but suffering from excessive ventilation before they are rooted usually indicate their bad condition by the marginal yellowing of their leaves before they drop and the stems become withered.

14. The plants are best left in the open coldframe all winter, mulched with leaves, preferably oak leaves, and in the early spring, before the buds have begun to push, they should be very carefully lifted and moved, with the whole root mat and adhering soil intact, to a peat and sand nursery bed at a spacing of about a foot each way.

Root Cuttings.

The early experiments with root cuttings gave such a small percentage of rooted plants that further experiments in the greenhouse were abandoned. At Whitesbog, N. J., however, in order that the

roots as well as the tops of selected wild plants might be utilized, cuttings of the roots were made about 3 to 4 inches long and of all sizes down to a little less than an eighth of an inch in diameter. These were given the same treatment as tubered cuttings in cold-frames. A high percentage of rooted plants resulted. This may prove to be one of the most satisfactory methods of propagating plants that have large root systems.

Treatment of Young Plants.

When blueberry plants, either large or small, are grown in porous pots, the surface of the pot should never be allowed to become dry, for the rootlets which grow through the soil to the wall of the pot for air are extremely fine and easily killed by drying, to the great injury of the plant. This danger may be eliminated by bedding the pots to the rim in a well-drained bed of sand or by setting the pot in another pot of 2 to 4 inches greater diameter, with a packing of moist sphagnum moss between and broken crocks at the bottom.

A burning of the young leaves and growing tips of twigs is often produced by the hot sun from the middle of June to the middle of September. Plants in pots or nursery beds are easily protected from such injury and forced to their maximum growth by a half-shade covering of slats, the slats and the spaces between being of the same width. On cloudy days the shade should be removed. It should not be used in the fall or spring.

During the winter the rooted cuttings, or 1-year-old plants, should be kept outdoors, exposed to freezing temperatures, their soil mulched with leaves, preferably oak leaves. When kept in a warm greenhouse during the winter they make no growth before spring. Even then their growth is abnormal, often feeble, or sometimes deferred for a whole year.

Field Planting.

Plants from cuttings or rooted shoots are ready for permanent field planting when they are 1 or 2 years old and 6 to 18 inches high.

It is a curious fact that these plants send out no new roots in

spring until they are in full leaf, when their flowering is nearly or quite finished and their principal twig growth has ceased. It is important, therefore, in taking up either a wild or a cultivated plant from the open ground that as much as possible of the old root mat be carefully lifted with the plant, for upon this the plants depend for moisture until their new rootlets are formed.

In the case of mature wild bushes with very large root systems, when it is practicable to secure but a fraction of the root mat, say a disk only 3 or 4 feet in diameter, it is the best procedure to cut all the stems at the time of transplanting to stumps 1 to 2 inches high. The bush will then produce a new and symmetrical top of a size suited to the capacity of the roots. The wood that is removed may be used for cuttings if the plant is sufficiently valuable.

The stems that make up a bush usually develop fibrous roots on their basal portions beneath the surface of the soil and above the root crown, at which the several stems unite. Such plants can be divided into several when taken up for transplanting. As many as 30 plants, each cut to a stump and with its own small but sufficient portion of the root mat, have been secured in this way from a large wild plant. By utilizing the various methods of propagation described in this publication as many as 600 cuttings of roots, stems, and twigs have been made from a single very large wild bush.

In resetting plants from which the tops have been removed, the stumps should be made to project about an inch above the surface of the ground. New shoots are formed in spring from such exposed stumps much earlier than from stumps covered with soil and not receiving the warmth of the sun's direct rays. If the plant when reset is made to occupy a moderate depression in the ground, the old stump and the bases of the new stems can afterward be covered with soil and a new root system will finally develop from the new wood.

When blueberry plants are set out in early spring, before the buds have begun to push, they usually make excellent growth, and for all plants that are pruned to the stump early spring is the best season for transplanting.

Conditions with unpruned plants, however, are different. Since blueberry plants make no new root growth until late spring, it often happens that a period of hot days intervenes between planting and

rooting, and many plants are injured by an excessive loss of water before they have had time to make connection with the water supply of the surrounding soil through the development of new roots. The danger of such injury is greatest in the case of plants transplanted from pots. The old root ball sends up most of its water to the leaves, and in consequence, being at first, as a rule, in imperfect capillary contact with the new outside soil, the root ball commonly contracts slightly. The contraction is often sufficient to put the roots at the surface of the root ball permanently out of contact with the surrounding soil, and the plant may continue to suffer severely from drought, although the soil outside the root ball contains plenty of moisture.

An early autumn field planting has furnished a remarkably successful means of avoiding this trouble with potted plants. At this season the excessive heat of summer is over, the plants are in full and vigorous leaf, and, being taken from pots, carry their whole root system with them. The formation of new roots begins at once and proceeds with great activity until the leaves are shed, at the approach of winter. In the spring, when new leaf growth begins, the plants are already well rooted in the soil. They pass through the early hot period without injury and develop remarkable size and vigor by autumn.

In preparing for a field plantation one precaution of special importance must not be overlooked. For the production of a crop of fruit under field conditions, insects are required to carry pollen from one flower to another. The honeybee works little on blueberry flowers. Her tongue is so short that she can not easily reach the nectar. The flowers are pollinated chiefly by bumblebees, whose tongues are long, and by some of the solitary wild bees that are small enough to crawl through the narrow opening of the corolla. When blueberry flowers are pollinated with pollen from their own bush the berries are fewer, smaller, and later in maturing than when the pollen comes from another bush. Some bushes are almost completely sterile to their own pollen. The pollen of a plant grown from a cutting is likewise unsatisfactory for the pollination of the parent plant or of other plants grown from cuttings of it. It is important, therefore, that a plantation should not be made up wholly from cuttings from one bush. Two stocks should be

used, a row of plants from one stock being followed by a row from the other.

In the permanent field plantation the bushes should be set 8 feet apart each way. When they reach mature size they will nearly or quite cover the intervening spaces.

When blueberry culture is to be tried in a sandy or gravelly soil deficient in peat or peatlike matter, the plants should be set in separate holes or trenches about 12 inches deep in a mixture of two to four parts of peat or half-rotted oak leaves to one part of clean sand. The excavations should be wide enough to provide ample space for new growth of the roots, not less than a foot each way from the old root ball. In small plantings, if the materials for the mixture are easily available in quantity, an 8-inch bed of it may be laid down over the whole surface of the ground, and if a planting is to be tried on a soil wholly unsuited to the blueberry, the area may first be covered with a 6-inch layer of sand, the bed of peat and sand mixture being then laid down on top of the sand layer. Wherever used, the peat and sand mixture should be thoroughly manipulated, so as to give it a uniform texture before the plants are set out in it, for in a soil in which layers of peat alternate with layers of sand the capillary connection of the two is usually imperfect, and a plant rooted in the peat may suffer severely from drought, although the neighboring sand still has water to spare. For a similar reason it is important that when the plant is first set out, the peat and sand mixture shall be very tightly pressed and packed about all sides of the old root ball.

To secure full vigor of growth the ground between the bushes must be kept free from all other vegetation. On rocky uplands or in situations deficient in peat a continuous mulch of oak leaves, when it is practicable to secure them, will help toward this end, as well as keep the soil in the necessary acid condition. It is more economical, however, to choose such a location for the plantation as will permit the use of horse-drawn machinery and will make mulching unnecessary.

The most favorable location for blueberry culture is a moist area with a peat covering and sand subsoil, the peat preferably of such a thickness that deep plowing will turn up some of the underlying sand.

The land should be so ditched that the water level can be kept at least a foot below the surface of the ground during the growing season.

The ground should be plowed to the depth of about 8 inches and repeatedly harrowed or otherwise tilled during the season preceding the planting, in order to kill the wild vegetation. The best time for such plowing is late spring, after the principal vegetation has used up its winter store of starch in completing its early growth and before the leaves have matured and the roots have begun the new storage of starch with which they can send up new sprouts.

The tillage of the plantation after the young bushes have been set out should be sufficiently thorough to keep down all competing vegetation. This is best done by horse cultivation, with careful hand hoeing and hand weeding close about the plants. As the bushes grow older and their roots extend into the spaces between the rows, they develop root mats close beneath the surface of the soil. The tillage over these root mats should be very shallow, not more than 2 or 3 inches. This is probably best accomplished by the use of a small, light spring-tooth cultivator with the teeth set closer together than usual.

In case of drought, the drainage ditches may be used to bring in water for subirrigation. But unless the surface of the ground is very level, subirrigation is likely to result in the injury of plants in the lower spots by excess of water. In uneven areas, therefore, surface irrigation, if accompanied by good drainage, is preferable to subirrigation and should be used if practicable.

Fertilizer experiments have shown that lime is positively injurious to blueberry plants and that stable manure, while producing a temporary stimulation of vegetative growth, is likely to cause serious injury later. For those desiring to experiment with fertilizers the following acid mixture is recommended, applied at the rate of 1,000 pounds per acre, or one-fifth of a pound per square yard:

	Pounds.
Acid phosphate (high grade, about 16 per cent available phosphoric acid)	600
Sulphate of potash (50 per cent potash)	200
Sulphate of ammonia (20 per cent nitrogen)	200

(Muriate of potash may be substituted for sulphate of potash.)

This and similar acid mixtures have been used with success on blueberry plants in both pot and field experiments, with no evidence thus far of cumulative injurious effects. However, as no fertilizer is required to make the swamp blueberry fruit abundantly and continuously in suitable peat and sand soils properly handled, the use of fertilizers in commercial plantations is not at present advocated.

The swamp blueberry does not require a yearly pruning. When one of the stems of a bush becomes unproductive from injury or old age it should, of course, be cut out. If a large part of a bush needs removal it is better to cut all the stems to the ground and let the plant send up new shoots, all of the same age, to form a wholly new and symmetrical top.

Yield and Profits.

By proper manipulation in the greenhouse, seedling blueberry plants can often be made to ripen a few berries in less than a year, but they do not come into commercial bearing in field plantations until they are 3 to 4 years old, when the plants are 1 to 3 feet high. They then increase slowly to full size and full bearing. Wild bushes of the swamp blueberry live to great age, often 50 to 100 years, still bearing heavily, and they often attain a height of 6 to 8 feet when growing in full sunlight; still more when shaded. Individual stems may remain productive for 10 to 25 years. When dead they are replaced by new and vigorous shoots from the root.

The field plantings resulting from the recent experiments in blueberry culture are too young to show the mature yield. Fortunately however, there is, near Elkhart, Ind., a small blueberry planting of mature age. The returns from this plantation set forward our knowledge of yields by at least a decade. The plantation is about $2\frac{1}{2}$ acres in extent. It was started in 1889 in a natural blueberry bog, which was first drained and then set with unselected wild-blueberry bushes. The plantation was profitable from the first, but exact records of yield and receipts are available only for the years 1910 to 1915, when the plantation was 21 to 26 years old. The data are shown in Table I.

TABLE I.— *Yield and receipts from a plantation of blueberries near Elkhart, Ind., 1910 to 1915, inclusive.*

Year.	Yield per acre.	Price (approximate average per quart).	Receipts per acre.	Profits per acre.
	Quarts.	*Cents.*		
1910 (a year of "almost total failure" because of late spring freezes)	419	$17\frac{1}{8}$	$71.87	$10
1911	2,266	$12\frac{7}{8}$	292.44	139
1912	2,379	$12\frac{7}{8}$	305.75	147
1913	1,770	$15\frac{1}{8}$	267.64	139
1914 (a year of severe midsummer drought)	1,397	$14\frac{1}{2}$	201.94	92
1915	2,214	$14\frac{1}{2}$	321.00	170
Average for the 6 years	1,741	$14\frac{1}{2}$	243.44	116

The annual expenses for weeding, cultivation, and irrigation were about $20 per acre. The cost of picking was 5 cents a quart. The general cost of maintenance of the equipment was about $2 per acre per year, the crates and boxes being used repeatedly. The computation includes an estimated annual charge of $12 per acre for interest, $2 for taxes, and $4 for depreciation or sinking fund.

It must be borne in mind that these figures are based on the yields from wild bushes transplanted without selection as to individual productiveness or the size of the berries. With bushes propagated from selected varieties, the yield should be greater and the berries much larger, this greater size probably effecting a reduction in the cost of picking and certainly an increase in the selling price.

Only a beginning has been made in the improvement of the blueberry. In a series of experiments involving the selection of superior wild strains, the growing of hybrids, and the forcing of choice varieties to quick fruiting by budding them on strong seedling stocks, berries seven-eighths of an inch in diameter have already been produced in the greenhouse. The yield and profits from such bushes in field plantations are not yet known.

Conclusion.

The introduction of the blueberry into agriculture has a much more profound significance than the mere addition of one more agricultural industry to those already in existence. Blueberries thrive best in soils so acid as to be considered worthless for ordinary agricultural purposes. Blueberry culture, therefore, not only promises to add to the general welfare through the utilization of land almost valueless otherwise, but it offers a profitable industry to individual land-owners in districts in which general agricultural conditions are especially hard and unpromising, and it suggests the possibility of the further utilization of such lands by means of other crops adapted to acid conditions.[1]

[1] For a discussion of the principles of acid-soil agriculture in districts in which the cost of lime is prohibitory, consult "The Agricultural Utilization of Acid Lands by Means of Acid-Tolerant Crops," United States Department of Agriculture, Bulletin No. 6, 1913.

ECONOMIC BOTANICAL EXPLORATIONS IN CHINA.

By Frank N. Meyer, Washington, D. C.

Delivered before the Society, with stereopticon illustrations, March 25, 1916.

Many of our most valued plants are really immigrants. I will enumerate only a few. For instance, wheat has come from Palestine and Syria; barley also; oats from Europe; corn (maize) from Central America; rice from India; apples from Europe and Central Asia; pears from Southwestern Europe; peaches from China; cherries from Asia Minor; vinifera grapes from Central Asia; oranges from Southern China; olives from regions around the Mediterranean; walnuts from China, Persia, and the Caucasus; hazelnuts from Southern and Western Europe; the so-called Irish potato came from the islands off the coast of Chili, South America; sweet potatoes from South America; peanuts and tobacco also; cucumbers and eggplant from India; and watermelons and sorghum from Africa. Our ornamental trees, shrubs, and herbs have been collected from the four quarters of the compass.

In introducing new plants, man has found out that the closer the climate a plant originally comes from resembles the one it is brought into, the better it will thrive. Now, certain regions on this globe resemble at large climatically and topographically the United States very much indeed, and of all countries China resembles North America very closely. And not only that climate and general appearances are much alike, but the Floras of both countries have much in common. A person having been suddenly transferred from some part of the South Eastern United States, or vice versa, would scarcely know at times where he really was.

The United States Department of Agriculture knew many of these facts, and a good many more, and as it is pretty nearly impossible to get enough data and material through correspondence, it was decided to make a thorough exploration in China along agricultural and horticultural lines, and I was selected to do this

interesting task. I made three separate trips into China and adjoining countries. These trips have covered a period of almost nine years.

China can be divided roughly into two zones, that is, the northern parts, which are semi-arid with cold, dry winters, while the central and southern sections are humid and have mild winters. My work has been primarily in Northern China because we have a special need in this country for real hardy plant material. In North China one finds rugged mountains with bits of forests still left, while the plains are cultivated to an extent that cannot be realized by those who have never seen the country.

The Chinese peasants have no regard for the wild vegetation, and they cut down and grub out every wild woody plant in their perpetual search for fuel. One therefore finds it exceedingly hard to discover anything of importance near centers of population, and a man is obliged to go into the real interior, often many weeks' march away from any large center. This necessitates, of course, being burdened with large quantities of equipment, required to camp out, and this is one of the banes connected with exploration work in the interior of China.

Every traveler carries with him bedding, washbasins, candles, soap, cooking utensils, supplies of all kinds, and what not else. And the filth in the country inns is sometimes beyond description.

However, one often is rewarded for all the difficulties experienced, for there are glorious blue mountains in China and lovely valleys and ravines, and when one does strike a monastery or a temple in some secluded mountain nook, where the original wild vegetation has been preserved by the priests, one feels fully compensated for the trials gone through.

The Western world does not quite realize how much we are indebted to the priests of the various sects of Buddhism and Taoism in China for having protected the wild plant growth around the temples. If it were not for them many a species or variety of plant which now adorns our gardens and parks would have been exterminated. And these priests not only protect and save the wild vegetation around their places of abode, but they also plant rare specimens in their gardens and courtyards. Around Peking one finds certain trees, such as *Catalpa bungei, Pinus bungeana,*

Aesculus chinensis, Xanthoceras sorbifolia, only planted in temple compounds; they do not occur wild any longer within the vicinity of that city, though apparently they formerly did so.

In speaking about these fine trees found in temple courts, there is one that impresses more than any other, and that is the white barked pine, *Pinus bungeana.* For serene impressiveness there is nothing to equal it. We have here the strange case of nature having invented the white-washing process of the trunk and branches so as to save the tree from being hurt by the strong sun in winter as well as in summer. The moment a branch dies it becomes black, and the contrast between dead and alive wood is really remarkable to behold. While Dr. Augustine Henry and Mr. E. H. Wilson found this pine wild only in Northwest Hupeh, I found it in the mountains of Southeast Shansi, in Central Shansi, and in South Kansu, and apparently it occurs in Honan also.

Among conifers that resist drouth, alkali, and extremes of temperatures to a fair degree, North China has given us *Thuja orientalis, Juniperus chinensis, Pinus sinensis,* and *Pinus bungeana.* China is remarkably rich in ornamental shrubs, and it is especially due to the very great successes of the well-known botanical collector, Mr. E. H. Wilson, of the Arnold Arboretum, that the Western world now has her gardens enriched by a few hundred of new species.

Of the numerous flowering shrubs that exist in China, I introduced *Viburnum fragrans* into the United States by sending scions from plants near Peking, but if it had not been for the expert plant propagator, Mr. Jackson T. Dawson of the Arnold Arboretum, who saved this material, we would not have this interesting shrub now.

Another interesting plant we introduced is the *Rosa xanthina,* a hardy, yellow bush-rose, occurring in its semi-double form, cultivated in gardens in Peking and Tientsin, but the single form I found wild in dry mountain gullies in the provinces of Shansi and Shantung. As a factor in hybridization experiments, it is of unusual value, and entirely new strains of hardy yellow roses may possibly originate from it.

One of the most remarkable discoveries I made was only a few months ago when I found a real hickory in China. Prof. C. S. Sargent, the eminent director of your beautiful Arnold Arboretum, has named it as *Carya cathayensis,* and paid me the compliment of

pronouncing it "the most interesting botanical discovery made in a generation."

It is strange to see how the Chinese gardeners with their primitive methods have learned how to master the propagation of certain plants. One finds, for instance, that in north China chrysanthemums are grafted upon a biennial Artemisia, which is very resistant to drouth, alkali and rough handling. In Central China again, where there is no alkali, a perennial wormwood is used for the same purpose, *Artemisia vulgaris*, var. *indica*.

In the provinces of Honan and Chihli, *Syringa meyeri* is grafted on *Ligustrum quihoui*, while around Shanghai, *Syringa oblata* is put high up on *Ligustrum lucidum* so as to make standard specimens of them.

The tea olive, *Osmanthus fragrans*, which grows on its own roots in central China, is grafted on the Chinese fringe tree, *Chionanthus retusa*, in the province of Shantung, while in the other northern provinces one finds it grafted on *Ligustrum quihoui*.

In Peking and Tientsin, *Prunus triloba*, *Prunus tomentosa*, flowering apricots and flowering peaches are all grafted on the remarkable drouth and alkali resistant *Amygdalys davidiana*, and since this stock is a very early one, the Chinese use it extensively in forcing.

The tree peony, *Paeonia suffruticosa*, is generally grafted on the roots of a very hardy herbaceous peony, *Paeonia albiflora*. Various species of rare junipers are put on oriental arbor vitae stock, *Thuja orientalis*. The ordinary pear from north China thrives to perfection on a very drouth resistant stock, which bears fruits not larger than the size of peas, *Pyrus betulaefolia*. Persimmons, *Diospyros kaki*, are grafted in north China on the "Ghoorma," *Diospyros lotus*, while in central China wild forms of kakis are employed.

In Soochow I have seen a yellow-berried ivy, *Hedera himalaica*, grafted high up on the stem of an Aralia, and a large flowering snowball, *Viburnum macrocephalum*, put on the stem of another species of Viburnum, while in Shansi standard tea roses are grafted on strong stems of *Rosa xanthina*, which is very resistant to alkali and dry heat.

The Chinese in north China have greenhouses, but instead of

having glass roofs, they have a mud roof, which only slightly slopes, and to admit light, they have a vertical front, always on the South, composed of stems of the great sorghum plant, *Andropogon vulgare,* which are covered over with strong transparent paper. Not having any stoves, hot water, or steam apparatus, the heating is done by means of flues and still with all these primitive arrangements they are able to force various plants into bloom, such as magnolias, *M. conspicua;* lilacs, *Syringa meyeri;* peonies, *Paeonia suffruticosa;* snowballs, *Viburnum fragrans;* flowering plums, *Prunus triloba;* flowering peaches and others, and they grow even cucumbers in these greenhouses, of which the young fruits are sold at high prices in winter and early spring.

As garden and park architects the Chinese are wonderfully clever, much more so than the world knows. Japan has been given all of the credit for beauty and daintiness of her gardens and parks, but in my opinion, a well-laid-out Chinese park is fully as interesting, and possesses even stronger outlines. Take, for instance, the park of the summer palace near Peking, there are very few parks in the world that can match it in striking beauty. We, here in America, certainly ought to have a real Chinese park in one of our progressive cities. Why could not Boston take the initiative?

Our Government is engaged upon the introduction of many important Chinese fruits, and I can only give you a rough outline of this work. There are in China hundreds of varieties of persimmons, and not only are they eaten fresh, but some varieties are dried like figs and resemble the last in looks and taste very much. They even make a liquor from some of them, also vinegar and even a special kind of sugar. Then there is the jujube, *Zizyphus jujuba,* a fruit very much like a Persian date, of which there also are a few hundred varieties in existence. This fruit tree is especially fit for regions with long hot summers, and a limited rainfall, such conditions prevailing in Texas, California, and other southwestern states.

The Chinese have found out that by "ringing" certain varieties every year by running a saw through the bark all around the main trunk, they can make them bear much heavier than by leaving them alone. It is curious to find out that the peasants in Zante, Greece, have this very same practice of ringing their currant vines every spring for the very same reason. One naturally asks oneself

how is it that two peoples so wide apart have adopted the same practice, but on different crops.

Another fruit of promise for extreme southern Florida and perhaps southern California, is the Litchi, which is well known to the American public in the dry state. It is a delicious fruit when fresh, and in China it is as popular as strawberries are with us.

The Chinese have also developed out of one of their haws, *Crataegus pinnatifida,* some varieties that bear large fruits which are fine for preserves. One really is surprised to notice how little interest the Americans have taken in the hundreds of species of haws which are indigenous here, and some of which produce excellent fruits. If some of you care to pay a visit to the wonderfully beautiful Arnold Arboretum at the time the haws are ripening, you will be amazed at the great number of promising forms, which are all native to the United States.

As the closing subject I want to draw your attention to the bamboos; no plant is higher estimated in China than bamboo, and the number of uses it is put to is legion. There is a saying in China that one can use bamboo in as many ways as there are days in the year. There are three distinct uses for bamboos, however; the first is to employ it as timber, and special kinds are grown for this purpose; the second is as a vegetable for its edible sprouts, and the third is for ornamental purposes. There are already some beautiful and large bamboo groves on private estates in this country, one near Savannah, Georgia, one at Abbeville, Louisiana, and one near Bakersfield, California, and a century from now perhaps bamboo will have become as common a sight in our southern states as it is in China and Japan.

SWEET PEA DISEASES AND THEIR CONTROL.

By J. J. Taubenhaus, Ph.D., College Station, Texas.

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The John Lewis Russell Lecture.

Many of us still remember the day when the hollyhock was a favorite flower, both in England and in this country. The hollyhock, however, has had its day. Accustomed, as we were, to giving it the place of honor in our gardens, it is now neglected and is hardly being considered as an ornamental flower. This change of attitude was painfully and not willingly adopted by growers. Numerous diseases especially the rust (*Puccinia malvaceaerum* Mont.) have practically made it impossible to grow this once ornamental plant. The sweet pea is now undergoing similar critical conditions. Numerous diseases are threatening its existence as a cut flower of economic importance. In England, growers are very much discouraged because of these diseases. In the United States, where this flower is gaining in popularity, conditions are not different.

There are few florists today who do not attempt to grow sweet peas. The majority start with enthusiasm and hope of success. However, many meet with reverses and give up in despair. On an average, all growers start right as far as cultural requirements are concerned. Why is it that so many fail? Failures with sweet peas are not mere accidents. They are due in most part to specific diseases caused by definite parasites. These diseases either so weaken the plants as to render them unfit for production or else kill them outright. Ninety percent of failure with greenhouse sweet peas, especially, may be directly accounted to sick soils, i. e. to parasitic fungi present there which make plant growth impossible.

Diseases of Indoor Sweet Peas.

The following are some of the more important diseases which attack greenhouse sweet peas.

Root rot, *Corticum vagum* B. and C.

This trouble is of considerable importance to greenhouse men. The disease may destroy the entire stand, or cause it to be uneven, thus necessitating several resowings. Severely infected plants have practically no root system. In less infected plants only one or two rootlets may be destroyed. The fungus produces a browning effect of the root before total destruction sets in. In very early stages of infection the seedlings are seen to have a wilted appearance; as the disease progresses the infected seedlings fall over and collapse. The fungus is not confined to the roots alone. It is often seen to work its way up the stem and produce a constricted area marking it off from the healthy part. The fungus being a soil organism is usually introduced with manure, infection taking place at any part of the roots or stems. In the latter case reddish sunken spots are observed at the base. Root rot is primarily a seedling disease, although older plants, too, may be affected. Such plants linger for some time and are valueless. *Corticum vagum* is a soil fungus which attacks a number of other greenhouse as well as outdoor plants. In this case, the organism either produces a damping off among young seedlings, or deep cambium lesions on the stem. With sweet peas the injury is the same. Root rot is introduced in the greenhouse with infected soil or manure. Over watering and a sour condition of the soil favors the disease.

Fusarium Wilt, *Fusarium lathyri* Taub.

This disease is of much greater importance to greenhouse men than root rot. The writer has known of instances where the disease has ruined the entire crop of indoor sweet peas. After several resowings, the owners gave up in despair the attempt to grow it further. Florists should do everything to prevent its introduction

in the house. In places where this disease has made its appearance the growing of greenhouse sweet peas had to be abandoned within less than two years. The disease produces a sudden flagging of the leaves which is accompanied by a wilting and collapse of the seedlings. Usually, upon sowing the seed, a fair percentage germinate and reach the height of about eight to ten inches, when they are attacked by the fungus. If the collapsed seedlings are allowed to remain on the ground, the dead stems will soon be covered with the sickle-shaped spores of the Fusarium fungus. Eventually the dead tissue rots, attracting small fruit flies which now begin to distribute the spores to different places in the same house. The trouble usually manifests itself in widely separated spots on the bench. These spots, however, quickly spread, involving the entire bed, which may suddenly assume a wilted appearance. Here and there, however, and in the same bench, a few plants remain alive and keep on growing in spite of the disease.

Stem or Collar rot, *Sclerotinia libertiana* Fckl.

This is usually a seedling disease, although it may attack plants of all ages. Like the Rhizoctonia rot it attacks many different kinds of seedlings. The trouble is most severe in houses poorly ventilated and in beds over-watered or lacking proper drainage; and in damp places out-of-doors. The disease spreads very quickly and is soon fatal. Affected plants first show a wilting of the tip and flagging of the leaves, and then the seedlings fall over and collapse. The cause of this disease is a fungus (*Sclerotinia libertiana* Fckl.), which also causes a drop disease of lettuce and of other plants. The fungus does not seem to attack the roots, but penetrates the collar of the stem and completely invades the vessels, thus clogging the upward flow of the water from the roots to the stem. Freshly collapsed plants usually have a water-soaked appearance, and are later overrun by a white weft, which is merely the mycelium of the fungus; this is followed by sclerotia (resting bodies), which are found scattered here and there on or within the affected stems. The fungus is a soil organism which occasionally causes trouble in clover fields. It is introduced with animal manure.

Thielavia root rot, *Thielavia basicola* Zopf.

Chittenden [1] and Massee [2] have suspected the fungus *Thielavia basicola* to be the cause of "Streak." This latter disease, Manns and Taubenhaus [3] have shown to be of bacterial origin, and related to a bacterial disease of the clovers. Plants severely infected with Thielavia have practically little or no root system, since the latter is destroyed by the fungus as rapidly as the roots appear. Whatever root system be present is of a stubby nature, charred in appearance. The fungus sometimes works up on the stem to a distance of 2 to 3 inches above ground, but never to the extent of invading the entire stem. It is probably due to this blackened appearance of the roots and of the stem nearest the ground that some workers have mistaken this disease for the well-known "Streak" disease. Chittenden, in his report to the National Sweet Pea Society of England, gives an accurate description of the "Streak," so that there can be no doubt but that he had the disease well in mind, that is, he described it as a stem disease. The Thielavia disease, as already mentioned, is not a stem but a root disease.

Chittenden seemed to have been unable to infect healthy sweet pea seedlings with the fungus *Thielavia basicola* under normal conditions of growth. It was only when his plants were subjected to over-watering that the fungus became an active parasite. In our inoculation experiments, healthy sweet pea seedlings have been readily infected by placing the Thielavia fungus on the roots of plants growing in sterile soil. In two to three weeks the roots were thoroughly diseased. Over-watering was not found necessary to bring about infection, although such treatment as well as injury to the roots favors the fungus in its activity.

The fungus *Thielavia basicola* is a very common source of seed-bed trouble in tobacco and trucking districts in the United States. Plants infected with *Thielavia basicola* do not quickly die; they

[1] Chittenden, F. J. Diseases of the sweet pea. Sweet Pea Annual: 14–24, 1912. England.

[2] Massee, George. A disease of sweet peas, asters and other plants — Thielavia basicola Zopf. Roy. Bot. Garden. Kew. Bul.: 44–52, 1912.

[3] Manns, T. F. and Taubenhaus, J. J. Streak, a bacterial disease of the sweet pea and clovers. Gard. Chron. (London): 215–216, 1913.

may linger for a long time, or indeed sometimes throughout the entire growing season. However, such infected plants remain very dwarfed, and are practically useless for flower production.

Root Knot or Nematode, *Heterodera radicicola* (Greef) Muller.

The disease is characterized by swellings on the roots. These are either small swellings formed singly, in pairs, or in strings, thus giving the affected root a beaded condition, or the swellings may be very large so as to be mistaken for root nodules. However, these galls cannot be mistaken for the normal root nodules, because the latter are lobed and are attached at one end, whereas the root gall produces a swelling of the entire surface of the part affected. Infected plants usually linger for a long time, but they can be distinguished by a thin growth and yellow, sickly looking leaves and stems. The disease is introduced with infected manure or with compost.

Mosaic.

Of all the greenhouse diseases, none challenges so much the skill and attention of the grower as this trouble. The great difficulty with mosaic is that we do not yet know the cause, although every indication points to its being a disease which is being induced by a specific parasite. Serious as this disease is, it may be kept in check, provided, of course, the grower recognizes certain fundamental facts. Mosaic is carried from diseased into healthy plants by the bites of insects. Aphids, especially, are great carriers of mosaic. Ordinarily winter-flowering sweet peas are not sown directly in the benches in the house. The seeds, as a rule, are at first sown in pots which are kept in a cold frame outdoors. The seedlings, as they grow up, are open to the attacks of the green aphid and several other insects which carry the germ from neighboring older sweet pea plants. As the young seedlings are taken into the house to be planted permanently on the benches the disease too is introduced with them. Moreover, as is usually the case, some of the aphids are also brought in. These soon begin to reproduce and to establish themselves well in the greenhouse. In

the meantime, too, the transplanted seedlings are now beginning to show definite symptoms of mosaic, and the trouble is now spread about by the new broods of these plant lice. It becomes therefore obvious that if instead of allowing the potted plants to remain outdoors until they are ready to be taken indoors, they be kept from the very beginning inside in a protected cold house, they will remain free and non-infected. In bringing in clean plants there will be no mosaic to bother us. This is indeed very simple and is the only way as far as is known to control mosaic on indoor sweet peas.

Mosaic is readily distinguished by a yellow mottling on the leaves, presenting in some instances, a beautiful mosaic structure, hence the name of the disease. This, however, is not the only symptom. Diseased plants exhibit a curling of the leaves, resembling the curling induced by the green aphids, but in this case, the plant lice do not curl the sweet pea leaves. Mosaic makes its appearance when the seedlings are from three to four weeks old. Often the trouble is so bad and the curling so pronounced that the plants thus affected cannot make any headway but remain dwarfed and wrinkled and twisted. Occasionally, however, diseased plants grow with the disease keeping pace. In this case, too, the affected host is useless, as far as commercial purposes are concerned, since the blossoms, too, are twisted and they are borne on short crooked peduncles.

Powdery Mildew, *Microsphera alni* (Wallr.) Salm.

The sweet pea mildew was first described by Massee [1] as being prevalent in England. *Erysiphe polygoni* was attributed as the cause, both of sweet pea mildew and that of the edible garden pea. In this country, the disease is very prevalent on greenhouse sweet peas, and outdoors during wet seasons. Ordinarily, however, in small garden lots, and especially where the plants do not receive any water, the disease is practically unimportant since the attack is usually very mild during the active season, but becomes some-

[1] Massee, G. Fungoid diseases of the sweet pea. Sweet Pea Annual: 20–21, 1906, England.

what more abundant when the plants have passed all usefulness. The writer had the opportunity of collecting specimens at random from six large houses, and from three acres of outdoor sweet peas in Massachusetts and from a similar three acre plantation in Pennsylvania. So far, the writer has only met with the conidial or oidium stage. On our own sweet pea field, we have carefully watched for a perithecial stage but without success. Late in the fall, badly infected leaves have been collected and put away to winter over, but that material has failed to develop perithecia.

Recently Blodgett [1] claimed to have found the perfect stage of this mildew, which he referred to the species *Microsphera alni* (Wallr.) Salm.

Physiological Troubles.

These troubles are usually induced by improper conditions of the soil. Root burn, for instance, may be induced by the excessive use of wood ashes applied with the manure. It is not uncommon for growers to use wood ashes at the rate of 1500 lbs. to 4500 square feet of bed space. This would be equivalent to nearly seven and one-half tons per acre. Under such conditions the roots actually burn up because of the strong alkalinity of the soil. Moreover hard-wood ashes contain about 30% caustic lime and from 5 to 12% potash. Both of these elements in excess in soil render it too alkaline for plant growth. To remedy this trouble, use acid phosphate followed by a good drenching of water. This will help to neutralize the alkalinity and restore the balanced food ration.

Bud drop. As the name implies the young flower buds at a very early age turn yellow and drop off. This drop should not be confused with the drop produced by the anthracnose disease. In the latter case, the flower develops into a normal spike but it is attacked soon by the fungus *Glomerella rufomaculans* which girdles it at a point of attachment between the flower and the peduncle. Here the flower often drops off, leaving behind the beheaded peduncle. In the latter case, however, the minute young flower bud never develops, instead it turns yellow and drops off. There

[1] Blodgett, F. M. Sweet pea Powdery mildew. Phytopath. 5: 237, 1915.

seems no doubt that the drop is a physiological disease and is induced by an unbalanced condition of food elements in the soil. This may occur in a soil that has been excessively fed or in a soil that is lacking in plant food.

Bud drop may be readily remedied by the application to the soil of small quantities of muriate of potash and acid phosphate.

Outdoor diseases of sweet peas.

All the diseases considered under the heading of indoor diseases are not confined to greenhouse sweet peas alone. Outdoor plants, too, are susceptible to the same troubles. Thielavia root rot and the mosaic are both equally serious on outdoor sweet peas, as they are on indoor plants. It is not therefore necessary to repeat what was already stated before.

Beside the diseases already mentioned under greenhouse troubles, there are three other important drawbacks to outdoor sweet peas. These are: the Green Aphis, Anthracnose, and Streak.

The Sweet Pea Aphis, *Macrosiphum pisi* Kalt.

Of all the insect pests not one rivals, perhaps, in economic importance the green aphis. This pest also attacks the garden pea, the red and crimson clovers, as well as vetches. The lice are often seen in clusters attacking practically all parts of the plant except the roots. They derive their food by sucking the plant juices. The pest is very prolific. It is estimated that each individual aphis, if allowed full sway, would be the progenitor of 423,912 aphids in one season. Fortunately, weather conditions as well as natural enemies help to keep it in check. Cool wet seasons are not very favorable to this pest.

Lady beetles are our greatest friends, as they feed on these plant lice. Unfortunately, many florists and gardeners have not as yet learned this fact. Believing the lady beetles to be their enemy, some florists do everything possible to destroy them. The writer knows of a breeder of sweet peas, who as he said "experimented for ten years to find out means of eradicating the lady beetles."

Of still greater importance in the control of the sweet pea aphis is a little fly scientifically known as *Aphidius testaceipes*. The adult female of this fly possesses a long sharp-pointed ovipositor which is used to pierce the body wall of the louse and of depositing its eggs within the aphis. The egg upon hatching in the body of its host, gives birth to a small legless larva which begins at once to feed upon the interior organs of the louse, the latter of which soon dies and remains attached to the part of the plant upon which it was feeding. After a time, the larva pupates and then cuts out a circular hole on the top of the mummied body of the aphis, emerging as a winged fly. The two sexes mate, and the female is again ready to deposit her eggs in the bodies of other living lice.

Besides the lady beetles and Aphidius flies, there is also a fungus, *Empusa aphidis*, which parasitizes the sweet pea louse. It may be possible to cultivate the fungus and use it to inoculate broadcast the aphids.

The sweet pea aphis is not only a pest by itself in that it sucks the plant juices, but it also acts as a carrier and transmitter of the pathogen which causes mosaic. The sweet pea aphis is not only an outdoor pest but it often causes great damage to greenhouse peas. If we are to succeed at all in controlling many of the diseases previously mentioned, it is essential that we keep in check the sweet pea aphis.

Anthracnose, *Glomerella rufomaculans* (B.) V. Sch. and Sp.

The symptoms of a disease known as Anthracnose are diverse. Sometimes it is manifested in a wilting or dying of the tips, which become whitish and brittle and readily break off. At other times the dying works downwards and involves the entire branch. Frequently also, such infected leaves become brittle and soon drop. Examination of an infected leaf with a hand lens shows that it is peppered with minute salmon-colored pustules. At the time of blossoming the fungus makes its attack on the peduncle at the point of union with the buds, in this case, producing bud-drop, the bud hangs wiltingly from the peduncle, or the fungus attacks both the flower bud and the peduncle, in which case both dry up but do not

fall off. The most easily distinguishable symptoms of this disease are on the seed pods. Infected pods lose their green color, become shriveled, and are soon covered with salmon-colored patches which cannot fail to attract attention. The cause of the anthracnose is the fungus *Glomerella rufomaculans*. This fungus causes also the bitter rot of apple and the ripe rot of grapes. Cross inoculations have definitely proven that the fungus can go back and forth from the apple to the sweet pea and *vice versa*. Anthracnose begins its destructive work early, even in the seedling stage, this sometimes being the case in greenhouse conditions. In field conditions the disease starts about July 1, when the plants are in their bloom and in the prime of beauty. This is also the time when the bitter rot disease of the apple makes its appearance in the orchard. The fungus is carried over winter on cankered limbs and mummied fruits of diseased pods and seeds of the sweet pea and also in the soil. Anthracnose is a field disease which thrives in practically every season. It is favored as much by wet summers as by hot dry months with abundance of dew at night.

Streak, *Bacillus lathyri* Manns and Taub.

The cause of streak is an organism scientifically known as *Bacillus lathyri* Manns and Taub. Next to anthracnose, streak is a very serious disease, which cannot be taken too lightly. Until recently it was thought that streak was confined to outdoor sweet peas. Recently, however, the writer has found this to be a serious disease of the greenhouse peas.

The disease was first observed, according to a letter from Mr. T. A. Weston, of Orpington, England, by H. J. R. Digges, of Dublin, in 1904 or 1905. In the fall of 1906 Mr. Weston states he had a note of the disease in the Gardener's Chronicle, describing it as a "new disease under the title of 'Streak.'" In 1908 George Massee, in a letter to a correspondent who had sent in diseased specimens, replied, "the disease is of a physiological nature."

So far as we have been able to obtain literature, it appears that only since the summer of 1908 has any definite work been done upon the disease. Chittenden, in England during 1908, 1909,

1910, carried out inoculation work with the supposed parasite, viz., *Thielavia basicola,* obtaining during the first two seasons negative results. In this work Chittenden gives a good description of the disease. He found in 1910 that by excessive watering he was able to get infections from Thielavia, but he does not indicate they were the typical "streak." He writes in conclusion, "To sum up, as far as our experiments go, the 'streak' disease is brought about by the attack of the fungus *Thielavia basicola* on plants that have received some check at the root."

Symptoms of the Disease. Like the Bacteriosis of beans, streak makes its appearance in the season of heavy dew. On the sweet pea the disease usually appears just as the plants begin to blossom; it is manifested by light reddish-brown to dark brown spots and streaks (the older almost purple) along the stems, having their origin usually near the ground, indicating distribution by spattering rain and infection through the stomata. The disease becomes quickly distributed over the more mature stems until the cambium and deeper tissues are destroyed in continuous areas, when the plant prematurely dies. Occasionally petioles and leaves show infection; the latter show the usual water-soaked spots common to the bacterial leaf blight of beans.

The disease is not a vascular infection; it confines its attack to the mesophyll, the cambium and deeper parenchymous tissues. The lesions on the stems gradually enlarge and deepen till they come together.

The disease is severe on Soy beans, in which the lower lesions girdle the stem and penetrate so deeply that the plants blow over, as is occasionally to be met with in the "black leg" of potatoes (a bacterial disease).

In young clover in August and September it is particularly injurious, vying with Bains' Anthracnose (*Colletotrichum trifolii* Bain) and the clover root borer in its activity. In clover of all ages, probably the most severe attack takes place in the petiole at its union with the stem; in which case the entire leaf dies and the lesion extends down into the stem. The blackening of the stems and the spotting and water-soaking of areas on the leaves are common with the clovers.

Seeds as Carriers of Disease.

Investigations by the writer have definitely proved that anthracnose, *Glomerella rufomaculans*, may be directly carried with the seed. It is also very probable that "streak" too is transmitted in a similar way. Seeds are also carriers of spores of numerous saphrophytic fungi, which are unable to produce disease on living plants, but capable of rotting the seed when they lay too long in moist soil while germinating. To overcome this difficulty, the seed should be soaked in a solution of 5 parts of formaldehyde in 95 of water, from two to five minutes. This treatment will also kill spores of anthracnose which may adhere to the surface of the seed coat. The treatment will not reach the interior of infected seed. These should be carefully picked out and burned.

In storehouses, sweet pea seeds are often ruined by a little insect known as the "drug-store beetle." This pest, however, may be easily kept in check by fumigation with bisulphide of carbon, used at the rate of one pound of the chemical to each 1,000 cubic feet of space.

Methods of Control.

Steam sterilization in the greenhouse is the best means of making a soil safe for sweet peas. Much has already been said and written on how to steam sterilize a soil and the advantages derived from it. Prospective growers will do well to install a heating plant with facilities to generate steam. The establishment of such a plant will more than pay for itself as it will put on a sound basis the safe and profitable growing of all greenhouse crops.

Where steam facilities are lacking, the formaldehyde treatment is the next best means of soil sterilization. Dissolve one pint of pure formaldehyde (sold as 40% pure in all drug stores) in 20 gallons of water. With a watering can apply one gallon of the solution to every square foot of bed space. This soil treatment is usually done a week to ten days before planting.

To control mildew, spray with a solution of potassium sulphide, also known as liver of sulphur, one ounce in three gallons of water.

Some growers merely coat the pipes with a paste made of flowers of sulphur which seems equally effective in controlling mildew. Where fumigation is done it should be attended to carefully. Cool nights or early in the morning is the time to fumigate.

There is, as yet, no remedy known to control the "streak" disease, nor was there sufficient work done with fungicides to prove that anthracnose might be controlled by spraying. Bordeaux mixture may be valuable if the spraying is started early, when the seedlings are from two to three weeks old. If the disease has been allowed to gain a foothold, spraying will then be of little value.

Since "streak" is also a disease which attacks clovers as well as many other legumes, it is essential to keep these hosts away from our sweet pea plantations.

More Knowledge Necessary.

The subject of the diseases of the sweet pea has only been touched upon by the writer. The investigations on sweet pea diseases, carried on by the writer, were largely made possible through the support of some private sweet pea enthusiasts, the late Mr. W. A. Burpee being one of them. More investigations are necessary in order to fully work out practical and efficient means of control. Both the American Sweet Pea Society, as well as the Massachusetts Horticultural Society can do much towards this end. A fellowship might be established in some reputable college, or some state aid may be evoked to carry further the investigations of this important subject.

TRANSACTIONS

OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1916

PART II

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND SEVENTEEN

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

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MASSACHUSETTS HORTICULTURAL SOCIETY.

1916.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER *Chairman* JOHN K. M. L. FARQUHAR PROF. F. C. SEARS FRED A. WILSON	*Committee on Lectures and Publications.*

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ANNUAL REPORTS FOR THE YEAR 1916.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1916, PART II.

REPORT OF THE BOARD OF TRUSTEES FOR THE YEAR 1916.

The Board of Trustees of the Massachusetts Horticultural Society presents herewith to the members a summary of the business transacted at its meetings during the year 1916.

January 8. Walter Hunnewell was elected Treasurer of the Society for the year 1916, William P. Rich was elected Secretary, Librarian, and Superintendent of the Building, and James Wheeler Superintendent of Exhibitions for the year.

It was voted to appropriate for the library $400.00 in addition to the income of the French and Farlow Funds and the unexpended balance of the library appropriation of the previous year, and $400.00 for the Committee on Gardens.

The office of Vice-President being vacant, on account of the election of Mr. Saltonstall as President, Nathaniel T. Kidder was elected to fill that position for the remainder of the year.

A communication from Charles F. Fairbanks was presented suggesting the holding of a joint exhibition with the American Gladiolus Society in August next. It was voted to refer the matter to the Committee on Prizes and Exhibitions and the sum of $400.00 for prizes was authorized, the amount to be included in the regular appropriation for the year.

Mr. Wheeler called attention to the convention of the American Pomological Society in 1917 and suggested that an invitation be extended to that Society to hold its meeting in connection with the fall fruit show of the Massachusetts Horticultural Society. It was voted that such an invitation be extended.

February 5. The special committee on rental of the halls of the Society's Building reported that no change of rates was advisable. In regard to granting the use of the halls to allied organizations and others at a reduced charge the committee recommended that in such cases the application be referred for approval to a member of the committee and the Superintendent of the Building. The report of the committee was accepted and its recommendations adopted.

A communication from Mr. George Robert White was presented in which he desired to increase the amount of the George Robert White Medal of Honor Fund by $1500.00 in order to provide for any future possible falling off of income, increase in cost, renewal of dies, etc. On motion of Mr. Saltonstall it was voted to accept the gift of Mr. White of the additional sum of $1500.00 and that the Society hold the same in trust as stated in the original deed of trust under date of December 10, 1910.

The matter of the appropriation for prizes and gratuities for the year 1917 was presented and on motion of Mr. Farquhar it was voted that a sum not exceeding $6000.00, in addition to the income of the special prize funds of the Society, be appropriated for prizes and gratuities for the year 1917.

June 16. A communication from Messrs. Zandbergen Bros. of Holland was presented offering a prize at the Spring Exhibition of 1917 of twenty dollars for the best collection of bulbs grown by a private gardener. It was voted to accept the offer subject to the usual rules governing such prizes.

An appropriation not exceeding $500.00, to include the income of the John Lewis Russell Fund, was voted for the winter course of lectures in January, February, and March, 1917.

Mr. Allen sent a report in writing concerning the change of color of the brick walls of the large exhibition hall in which he stated

that the work had been successfully carried out and was very generally approved. On motion of Mr. Estabrook it was voted that the thanks of the Society be extended to Mr. Allen for the successful decoration of the hall.

The proposed outdoor exhibition in June was considered and Prof. Sargent suggested that the matter be referred to the Advisory Committee with power. On motion of Mr. Estabrook it was voted that such an exhibition be held in some suitable place in Boston provided a sufficient guarantee fund be secured to protect the Society from possible loss. It was further voted, on motion of General Weld, that all details connected with the proposed outdoor exhibition in June, 1917, including the selection of a proper site, the securing of a sufficient guarantee fund, and all other matters incident thereto be referred to the Advisory Committee with full authority.

It was voted, on motion of Prof. Sargent, that the Committee on Fruits, in conjunction with the Committee on Prizes and Exhibitions, be requested to take up and consider the advisability of holding a special fruit show in the fall of 1917, to prepare a suitable schedule, and submit it to the Board at its next meeting.

October 16. President Saltonstall called attention to the matter of the large amount of insurance carried on the Society's Building and suggested that in view of its solid and fireproof construction the amount of insurance might well be reduced. He presented several reports from experts in this line favoring such reduction.

After a general discussion of the subject it was finally voted, that the full amount of insurance be carried for the next term.

Regarding the insurance on the library it was voted that it be insured for such a sum as the Library Committee thinks wise.

The following motion was adopted:

Voted: — That the bequest of Miss Helen Collamore to the Society of $5000.00 and accumulated interest amounting to $50.00 — total $5050.00 — be accepted and that the Treasurer be asked to hold the same as part of the permanent funds of the Society, the income thereof to be used from year to year as the Trustees may determine.

Appropriations were voted as follow:

For the Children's Garden Exhibition, $350.00 to include the State appropriation of $200.00, and Mr. Wilder and the Secretary were appointed a committee to secure additional prizes for this exhibition.

For the Committee on Gardens a sum not exceeding $200.00.

Mr. Wilder called attention to the reduction in the amount of prizes offered for fruits during the last few years. He said that the fruit interest was an important department of the Society's work and should receive suitable encouragement. On motion of Mr. Wheeler it was voted to recommend to the Advisory Committee that the sum of $1400.00 be appropriated for fruits in the Schedule of the ensuing year.

The special committee on nominations for the various committees of the Society for the year 1917 submitted the following list which was adopted:

Massachusetts Horticultural Society.

Nominations for 1917 Committees.

Finance: — Walter Hunnewell, Chairman, Arthur F. Estabrook, Stephen M. Weld.

Membership: — Thomas Allen, George E. Barnard, Richard M. Saltonstall.

Prizes and Exhibitions: — James Wheeler, Chairman, John K. M. L. Farquhar, Duncan Finlayson, Thomas Roland.

Plants and Flowers: — William Anderson, Chairman, Arthur H. Fewkes, S. J. Goddard, Arthur E. Griffin, Donald McKenzie.

Fruits: — Edward B. Wilder, Chairman, Wm. N. Craig, Isaac H. Locke, James Methven.

Vegetables: — John L. Smith, Chairman, Edward Parker, Wm. C. Rust.

Gardens: — Richard M. Saltonstall, Chairman, John S. Ames, David R. Craig, William Nicholson, Charles Sander, Charles H. Tenney.

Library: — Charles S. Sargent, Chairman, Ernest B. Dane, Nathaniel T. Kidder.

Lectures and Publications: — Fred A. Wilson, Chairman, Leonard Barron, Nathaniel T. Kidder.

Children's Gardens: — Henry S. Adams, Chairman, Dr. Harris Kennedy, Mrs. W. Rodman Peabody, Miss Margaret A. Rand, James Wheeler.

December 4. It was voted to invite the American Sweet Pea Society to hold its annual meeting and exhibition in Horticultural Hall, Boston, on July 7, 1917, in conjunction with the Sweet Pea Exhibition of the Massachusetts Horticultural Society; and it was further voted to extend an invitation to the American Carnation Society to hold its annual convention and exhibition in the halls of the Society in January, 1918.

A communication from Mr. E. K. Butler was presented offering forty dollars in prizes for exhibits of roses at the Rose Exhibition of the Society in June, 1917. It was voted to accept with thanks the offer of Mr. Butler and to incorporate the prizes in the Schedule of the year.

It was voted also to accept the offer of Mr. Wm. B. H. Dowse of a silver vase to be awarded to the exhibitor making the best showing of vegetables at the exhibitions of the Society during the year 1917.

The Committee on the Library reported through its Chairman, Prof. Sargent, on the subject of safeguarding the library and particularly the accession books and catalogues. The committee suggested the installation of several metal doors and window shutters. The matter was referred to the Advisory Committee with authority to take such action as may be deemed necessary. In the meantime the Secretary was authorized to hire a suitable box in the vaults of the Massachusetts Trust Company.

The special committee on the award of the George Robert White Medal of Honor for the year 1916 reported the name of William Robinson of England in recognition of his distinguished services in the advancement of the interest in horticulture. On motion of Prof. Sargent it was voted unanimously to award the medal to Mr. Robinson.

Mr. Allen reported further progress in the details of the outdoor exhibition of June next. He showed plans of the general arrangement of the various exhibits which were approved by the Board.

In this connection it was voted, on motion of Mr. Estabrook, to authorize the Treasurer to advance from time to time from the funds of the Society such amounts of money as may be required in the installation of this exhibition with the understanding that the Society shall be reimbursed for such expenditure from the receipts of the exhibition or from the subscribers to the guarantee fund.

William P. Rich,
Secretary.

REPORT OF THE COMMITTEE ON PRIZES AND EXHIBITIONS FOR THE YEAR 1916.

By James Wheeler, Chairman.

The Committee on Prizes and Exhibitions has held numerous meetings during the year preparing the Schedule of prizes for the year 1917 and arranging the exhibitions of 1916.

The free exhibitions of the year have been good and well attended but the pay shows do not have the support that the Society merits. The large private estates do not make special efforts to bring in large specimens of plants nor to exhibit new and rare varieties as they formerly did.

The commercial growers have come forward and supported the Society generously, and while they cannot give the time to grow special large plants, flowers, fruits, and vegetables they bring in the best they have and assist greatly in making the exhibitions of today.

The receipts of the pay shows may have been as good as the shows merit.

By direction of the Advisory Committee we have arranged a large Spring Exhibition in March, 1917, and a Special Fruit Show in October, omitting some of the smaller exhibitions and the usual Autumn Show.

The committee earnestly requests a larger coöperation of the owners of large estates and their gardeners in taking greater interest in the exhibitions of the Society.

The Schedule of Prizes and Exhibitions for the year 1917 has been approved by the Board of Trustees and published.

It is earnestly hoped that all the members of the Society will coöperate in making the coming year a notable one in the history of the Society.

James Wheeler
John K. M. L. Farquhar
Duncan Finlayson
T. D. Hatfield
A. H. Wingett
} *Committee on Prizes and Exhibitions.*

REPORT OF THE COMMITTEE ON PLANTS AND FLOWERS FOR THE YEAR 1916.

By William Anderson, Chairman.

The Spring Exhibition, which opened on March 17th and continued for three days, was equal in quantity and quality of plants and flowers shown to any held in recent years.

Noteworthy among the exhibits we would first mention the spacious garden arranged by R. and J. Farquhar and Co. which occupied one end of the main exhibition hall. Excellent taste was shown in placing the masses of Rhododendron Mrs. Wagner, *R. Kaempferi,* and while Lilacs. There were also many excellent plants of Wistaria, Laburnum, and the new Chinese *Lilium regale.* The bulb flower exhibit from Weld Garden, Duncan Finlayson, superintendent, was notable for its quantity, great variety, and tasteful arrangement. Equally noteworthy were the fine Narcissi and Tulips shown by A. W. Preston, J. L. Smith, gardener, in different classes.

W. W. Edgar Co. exhibited a fine specimen of *Acacia heterophylla;* this firm was first with a group of foliage and flowering plants. Fine Cyclamen, Cineraries, Lilies, and Primulas were shown. Eric H. Wetterlow, gardener to Mrs. Lester Leland, was awarded the special prize offered for the best ten Cyclamen. E. B. Dane was first in cut orchids; the same exhibitor was awarded a First Class Certificate for a plant of *Sophro-Cattleya Thwaitesii;* also a fine plant of *Odontioda Bradshawiae* bearing a spike of sixty-five blooms was awarded a Silver Medal.

Walter Hunnewell, T. D. Hatfield, gardener, exhibited a nice lot of *Dendrobium nobile* and its varieties for which he was awarded a Cultural Certificate. Thomas Watt exhibited fine blooms of Moutan Peonies. Honorable Mention was awarded to S. J. Goddard for Carnation Doris, to W. R. Nicholson for seedling Carnation, and to F. Dorner and Son for a vase of seedling Carna-

tions. F. Lemon of Richmond, Indiana, was awarded a Certificate of Merit for *Primula malacoides rosea,* a dwarf free flowering form of *Primula malacoides.* Mrs. C. G. Weld, W. C. Rust, gardener, exhibited a nice group of orchids notable among which were some well-flowered plants of *Dendrobium Wardianum;* the same exhibitor was awarded a Certificate of Merit for Antirrhinum Weld Pink. William Sim exhibited Sweet Peas of excellent quality.

May Exhibition, May 10–14.

The May Exhibition, which opened May 10, did not come up to expectations, due principally to the backward season which ruled out some of the most important exhibits. In many of the classes there were no entries at all and in many others no competition.

Among the best exhibits was the very interesting and valuable collection of Conifers shown by the Blue Hill Nurseries, South Braintree, Mass. This collection included varieties of Abies, Pines, Piceas, Thuyas, and Taxus; all known to be hardy in Massachusetts. A Silver Medal was awarded. Duncan Finlayson exhibited a remarkable and valuable collection of dwarfed Japanese plants for which he obtained first prize and a Silver Medal. F. R. Pierson and Co. of Tarrytown, N. Y., showed a most tastefully arranged group of roses covering one hundred square feet.

Another exhibit that showed fine taste and ability in arrangement was that of Penn the Florist. His exhibit was made up of floral baskets and vases in which *Iris hispanica,* Antirrhinums, Marguerites, and orchids were most effectively arranged. A. M. Davenport was first and the W. W. Edgar Co. of Waverley second for a group of flowering and foliage plants. F. J. Dolansky of Lynn was the only exhibitor in the class calling for a group of orchids covering two hundred square feet.

Thomas Roland exhibited a group of *Bougainvillea Sanderiana* for which he was awarded a Silver Medal. Other excellent plant exhibits were the *Calceolaria Stewartii* shown by Winthrop Ames, and Pelargoniums by Mrs. C. G. Weld. Walter Hunnewell was

the principal exhibitor of Hybrid Rhododendrons. He also exhibited a group of *Rhododendron sinense,* a pale yellow variety raised from seeds collected in China for which he was awarded a Silver Medal.

Charles Sander, gardener at Holm Lea, was awarded a Gold Medal for a fine display of seedling Azaleas, twenty-five varieties, the result of crosses between *A. Hinodigiri,* Garnot, and Romantaie. The same exhibitor also had on exhibition a seedling Rhododendron, the result of a cross between *R. Smirnowi* and a garden variety. In vases of fifty roses, Hadley, Mrs. Bayard Thayer, and Mrs. Aaron Ward were the winners in their respective colors.

In the Rose classes for private gardeners W. C. Rust exhibited splendid vases of Hoosier Beauty, Mrs. Charles Russell, and Lady Hillingdon. The Albert Roper Estate was awarded a Silver Medal for a fine cerise pink Carnation, Albert Roper. S. J. Goddard exhibited Carnation Doris and was awarded a Certificate of Merit. A. W. Preston, J. L. Smith, gardener, exhibited a plant of *Brasso-Cattleya Maroniae* (*Cattleya gigas* × *Brasso-Cattleya Digbyana*) for which he was awarded a Silver Medal. F. W. Fletcher & Co. exhibited a light blue Delphinium, Clivedon Beauty, and received Honorable Mention.

Exhibition, May 27.

Miss Grace Sturtevant, Wellesley Farms, exhibited a collection of Iris, the best of which were: Regeliocyclus, a dwarf and interesting variety, Mrs. Alan Grey, and Trojana, and a vase of Sappho seedlings. The collection was awarded Honorable Mention. Mr. Bayard Thayer, William Anderson, superintendent, was awarded a Silver Medal for *Lilium Willmottiae,* a new lily from China and shown for the first time. This lily grows from three to four feet in height with wiry stems clothed with narrow, oblong leaves; the flowers are apricot-yellow spotted with brown, three inches or more across and strongly recurved. It is perfectly hardy and flowers outside in late June and early July. Oliver Ames, Edward Parker, gardener, exhibited a nice lot of Darwin Tulips for which he was awarded Honorable Mention.

Exhibition, June 10.

June 10th was the date of the Peony Show, but on account of the lateness of the season the show was postponed one week. However, on the 10th Miss Grace Sturtevant exhibited twenty-one seedling Irises, all of the Germanica and Pallida type. The awards were as follow:

Iris Merlin (Oriflamme × Iris King) awarded a Certificate of Merit; standards light bronze-purple; falls deep reddish purple, large and broad; growth vigorous, about three feet.

Iris Mme. Cheri (Caterina × Mrs. G. Darwin) awarded Certificate of Merit; standards rosy bronze; falls blue, tinted bronze; growth vigorous, about three feet.

Iris Niverna (Cypriana × Mrs. G. Darwin) awarded Honorable Mention; standards, bronze, tinted with purple; falls light blue, throat veined with yellow.

Iris Empire (Monsignor × Aurea) awarded Honorable Mention; standards yellow, tinged with bronze; falls bronze-yellow, tinged with purple.

Iris Hope (parentage not given) awarded Honorable Mention; standards light rosy lavender; falls lavender, with deeper lavender veins.

Peony Exhibition, June 17 and 18.

This usually fine show, after having been postponed one week on account of the backward season, still came a week too early for Peonies in the vicinity of Boston. The result was that few local Peonies were shown. However, fine displays of Iris, Hemerocallis, Oriental Poppies, and other herbaceous flowers helped to make a nice exhibition.

G. H. Peterson of Fair Lawn, New Jersey, was first in most of the Peony classes. Other prize winners were Mrs. J. L. Gardner, A. H. Fewkes, S. G. Harris, G. N. Smith, and Mrs. C. S. Minot. The Wellesley Nurseries had a fine collection, not for competition. There were no first-class single varieties shown. The following is a

list of the best double varieties shown: Felix Crousse, Mme. de Galhau, Triomphe de l'Exposition de Lille, Baroness Schroeder, Reine Hortense, Jeanne d'Arc, Eugene Verdier, Comte de Gonia, Mme. Emile Galle, Avalanche, Mme. Jules Dessert, Sarah Bernhardt, Stephania, Alfred de Musset, Pink Beauty, and Asa Gray.

Miss Grace Sturtevant had a notable exhibit of seedling Iris of the Germanica type. Thirty varieties were shown. The following is a description of the best varieties and the awards made:

Iris Avalon (Queen of May × Caterina) awarded Silver Medal; self colored lilac blooms of fine substance; falls flare and standards overlap; beard, silvery white; stems, strong, about four feet in height.

Iris Stanley H. White (Hector × Caterina) awarded Certificate of Merit; flower is rich yellow except for the fine yellow lines in the falls, the top has a rounded effect due to the ruffled standards overlapping.

Iris Ann Leslie (Dr. Bernice seedling) awarded Honorable Mention; a strong growing variety with flowers of a very unusual color, falls velvety carmine, standards white, tinted rose towards the top, stems three feet in height.

E. B. Dane had a nice exhibit of orchid blooms including the following: *Vanda suavis, Dendrobium clavatum, Odontioda Charlesworthii, Sobralia xantholeuca, Cypripedium Maudiae, Cypripedium Lawrenceanum Hyeanum, Miltonia vexillaria, Cattleya gigas,* and a fine variety of *Oncidium crispum.* J. T. Butterworth also exhibited cut blooms of *Dendrobium Jamesianum, Odontoglossum crispum,* and Miltonias.

R. and J. Farquhar and Co. received a Silver Medal for an extensive display of herbaceous plants and shrubs. The Blue Hill Nurseries exhibited a collection of nine varieties of Hemerocallis the finest of which was the pure bright orange Dr. Regal. The Mount Desert Nurseries of Bar Harbor had a novel and artistic display of Eremurus, Iris, Dicentra, Solomon's Seal, Lilacs, Hemerocallis, and other hardy flowers; each variety arranged by itself in a branching bamboo stand.

Rose and Strawberry Exhibition, July 1 and 2.

On account of the lateness of the season this show had to be postponed one week and even then it did not seem to suit the local growers. However, the hall was well filled.

Conspicuous among the Rose exhibits was the fine table of Climbing Roses shown by A. J. Fish of New Bedford; the most striking varieties being Silver Moon, Dr. Van Fleet, Climbing American Beauty, and Baroness Ittersum. A Silver Medal was awarded this exhibit.

In the competitive classes the leading prize winners were Thomas N. Cook, Robert Seaver, A. W. Preston, W. C. Winter, and George E. Barnard. In the Hybrid Perpetual classes the old varieties held their own. The Hybrid Tea Roses shown attracted much attention, a few of the finest were Duke of Westminster, Mme. Melane Soupert, Mme. Caroline Testout, Mabel Drew, The Lyon, J. B. Clark, Mme. Paul Eulor, Dean Hole, Otto von Bismarck.

There were good Peony collections from T. C. Thurlow's Sons Co. and A. H. Fewkes. R. and J. Farquhar and Co. and The Blue Hill Nurseries had fine displays of herbaceous flowers well arranged. E. B. Dane and J. T. Butterworth exhibited nice tables of cut orchids. Duncan Finlayson was awarded a Certificate of Merit for a plant of the pure white *Coelogyne Mooreana.*

Sweet Pea Exhibition, July 8 and 9.

The Sweet Pea Show was a good one, the exhibits being of high quality, and the large hall was well filled. The dates seemed a little too early for growers in the vicinity of Boston, however, so the principal prize winners were from Lenox. Edwin Jenkins and S. W. Carlquist had very fine exhibits. The following is a list of the best varieties in their respective colors:

Constance Hinton, White; Sunproof Crimson, Crimson; Mrs. Dameron, Yellow; Rosabelle, Carmine; Blue Monarch, Blue; Lady Evelyn Eyre, Blush; Hercules, Deep Pink; Mrs. H. Dickson,

Cream Pink; Mary Unwin, Orange; Orchid, Lavender; Royal Purple, Purple; John Ridd, Maroon; Jean Ireland, Picotee Edged; Jessie Cuthbertson, Striped Red.

S. W. Carlquist was awarded a Silver Medal for a display of Sweet Peas which included many of the newest varieties. Wild flowers were an interesting feature of the show, Albert Davidson of Melrose taking first with 114 varieties. Mrs. Homer Gage of Shrewsbury was the only exhibitor of Japanese Iris and A. W. Preston put up a nice exhibit of Tea and Hybrid Tea Roses.

Special Exhibition, July 15.

Dr. and Mrs. Homer Gage of Shrewsbury and Dr. and Mrs. Harris Kennedy of Milton exhibited Japanese Iris. The Homer Gage collection contained thirty varieties and was awarded a Silver Medal. The Eastern Nurseries had on exhibition 14 varieties of hardy Spiraea. R. and J. Farquhar and Co. put up a large group of *Lilium regale* for which they were awarded Honorable Mention.

Gladiolus Exhibition.

The Gladiolus Exhibition opened on August 11 and continued for three days. The American Gladiolus Society also held its annual exhibition under the auspices of this Society on the same date. It was decidedly the largest and best exhibition of Gladiolus ever seen in Boston. There were many new varieties and some of these were remarkable for their color, size, and texture. The Primulinus hybrids were noteworthy for their wonderful color and gracefulness and were undoubtedly the most admired flowers on exhibition. The principal exhibitors were C. F. Fairbanks of Milton, L. Merton Gage, and Thomas Coggar; also T. A. Havemeyer and John Lewis Childs of New York. Among the many fine varieties on exhibition were Julie M. Fairbanks, Muriel, Daisy Rand, Goliath, Schwaben, Miss Cavell, Mrs. Watt, White Ivory, Evelyn Kirtland, Mme. Mounet-Sully, Mrs. F. Pendleton. In the non-competitive displays C. F. Fairbanks was awarded a Gold

Medal for a large and artistic group, also for his work in the advancement and culture of the Gladiolus. S. E. Spencer of the Brooklands Gardens also had a large group of splendid flowers.

In other classes the Blue Hill Nurseries took first for best collection of herbaceous Phlox and Weld Garden was first with fine Tuberous Begonias.

On August 26, L. Merton Gage of Natick, Mass., was awarded a Silver Medal for Gladiolus Mrs. Dr. Norton, a very beautiful seedling of the Gandavensis type. The flowers were very large, well set on a tall spike, white in color, suffused at the edges with soft pink, the three lower petals blotched with sulphur yellow.

Dahlia Exhibition, September 9 and 10.

On account of the lateness of the season the show was not as extensive as usual, but the quality of the flowers shown was extra good. The outstanding feature of the show was the three large vases of the new rose pink Peony-flowered Dahlia, Mrs. Frederick Grinnell, exhibited by John P. Rooney of New Bedford, Mass., which was awarded a Silver Medal. E. W. Bennett received a Certificate of Merit for Dahlia Meritorious, a very large flower of the Decorative type. Fottler, Fiske and Rawson Co. was awarded a Silver Medal for an extensive and well-arranged display of Dahlias and Gladioli.

Others who had fine Dahlia displays were Mrs. L. A. Towle, George L. Stillman, J. K. Alexander, and W. D. Hathaway. For the largest and best collection of all classes J. K. Alexander was first. W. N. Craig was first for 30 vases of herbaceous flowers and there were also extensive collections of wild flowers.

The Autumn Exhibition.

The Autumn Exhibition which opened on November 1 was good, although there was a lack of competition in many of the classes. There were no orchids entered for competition except in the class for a single specimen. With the exception of the large plant of

Garza exhibited by Galen L. Stone the trained Chrysanthemum plants were very ordinary. The plant groups were good, especially that of 150 square feet limited to private gardeners in which William Thatcher, gardener to Mrs. John L. Gardner, displayed excellent taste in a gracefully arranged group in which Chrysanthemums, Liliums, and Nerine Fothergillii predominated. A. M. Davenport was first with a group of flowering and foliage plants, covering 300 square feet, in which Begonia Mrs. Heal and Chrysanthemums were effectively arranged. Close massing of the plants in the larger groups was the rule and this did not add to their effectiveness.

Begonias were largely shown and were of good quality, far surpassing the Chrysanthemums in attractiveness. E. H. Wetterlow, gardener to Mrs. Lester Leland, was first with six specimens of Gloire de Lorraine. For six plants of any other color E. S. Webster was first with six magnificent plants of Begonia Optima, one of which was also awarded a Silver Medal. Mrs. C. G. Weld, William C. Rust, gardener, was awarded a Silver Medal for a collection of winter flowering Begonias which included the following: Optima, Apricot, Elaitor, Winter Cheer, and Mrs. Heal. Thomas Roland exhibited a splendid lot of highly colored Crotons and plants of early flowering Camellias.

Caplan the Florist was the only exhibitor in the class for a display showing the various ways flowers can be used for home decoration. His display consisted of neatly arranged baskets and vases of cut flowers.

The cut flowers of Chrysanthemums were very fine. The principal exhibitors and prize winners were Galen L. Stone, W. H. Wellington, James Nicol, W. W. Edgar Co., Mrs. Lester Leland, and R. E. Traiser.

Splendid Carnations were exhibited by A. A. Pembroke, J. W. Minott, and Charles S. Strout. The best varieties of these were Rosette, Pocahontas, Champion, Pink Delight, Mrs. C. W. Ward, and Matchless. A. A. Pembroke was awarded Honorable Mention for a sport of Benora, a good variety, a shade darker than Benora. Charles S. Strout of Biddeford, Maine, received Honorable Mention for seedling crimson Carnation No. 9.

Chas. E. Holbrow was awarded Honorable Mention for a Rose

seedling, a cross between Christie Miller and Richmond. A. W. Preston was awarded a First Class Certificate for *Cattleya Fabia alba* and a Silver Medal for Cattleya Lord Rothschild alba. The Waban Rose Conservatories sent in splendid vases of Mrs. Charles Russell and Hadley Roses.

November 25, Henry Stewart of Waltham was awarded a Silver Medal for superior cultivation of *Oncidium varicosum Rogersii,* a plant which carried over 300 flowers.

William Anderson Arthur H. Fewkes S. J. Goddard Donald McKenzie William Sim	*Committee on Plants and Flowers.*

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

1916.

Spring Exhibition.

March 17, 18, and 19.

Theodore Lyman Fund, No. 2.

Acacia.— One specimen plant:
1st, W. W. Edgar Co., $10.
Cinerarias.— Grandiflora type, six plants:
1st, Miss Cornelia Warren, $12; 2d, Mrs. C. G. Weld, $6.
One specimen plant:
Mrs. C. G. Weld, $4.
Stellata type, six plants:
1st, Weld Garden, $12; 2d, Mrs. J. L. Gardner, $6.
One specimen plant:
Mrs. J. L. Gardner, $4.
Cyclamens.— Eight plants:
1st, Mrs. Lester Leland, $25; 2d, Mrs. J. L. Gardner, $12.
Six plants:
1st, Mrs. J. L. Gardner, $15; 2d, E. B. Dane, $8.
Cytisus.— Six plants:
1st, Miss Cornelia Warren, $15.
Ericas.— Six plants, in not less than three varieties:
1st, Miss Cornelia Warren, $15.
Freesias.— Six pots:
2d, Weld Garden, $4.
Hard-wooded Greenhouse Plants, other than Acacias and Ericas.— Six specimen plants:
1st, W. W. Edgar Co., $15; 2d, Weld Garden, $8.
Hyacinths.— Six pans not exceeding ten in.:
1st, Weld Garden, $10.
One pan not exceeding 10 inches.
1st, A. W. Preston, $4; 2d, A. W. Preston, $2.
Liliums.— Twelve pots, one or more varieties:
1st, W. W. Edgar Co., $15.
Lily of the Valley.— Six pots, not over eight in.:
1st, A. W. Preston, $6; 2d, Oliver Ames, $4.

Narcissi.— Large Trumpet, twelve pots:
1st, A. W. Preston, $15; 2d, Weld Garden, $8.
Large Trumpet, four pots:
1st, Weld Garden, $6.
Short Trumpet, twelve pots:
1st, A. W. Preston, $10; 2d, Weld Garden, $5.
Orchids.— Group of plants arranged for effect with ferns or other foliage plants, to cover not less than 50 sq. ft.:
1st, Mrs. C. G. Weld, $30.

Society's Prizes.

Palms.— Six plants in pots:
1st, Weld Garden, $20.
Schizanthus.— Six plants:
1st, Miss Cornelia Warren, $12; 2d, Weld Garden, $6.
Tulips.— Six pans not over ten in.:
1st, A. W. Preston, $12; 2d, Mrs. J. L. Gardner, $6.
Three pans, White:
1st, Mrs. J. L. Gardner, $6; 2d, A. W. Preston, $3.
Three pans, Red:
1st, Weld Garden, $6; 2d, Mrs. J. L. Gardner, $3.
Three pans, Pink:
1st, Mrs. J. L. Gardner, La Reve, $6; 2d, Weld Garden, Pink Beauty, $3.
Three pans, Yellow:
1st, Mrs. J. L. Gardner, Canary Bird, $6; 2d, A. W. Preston, Golden King, $3.
Three pans, any other color:
1st, Weld Garden, $6; 2d, Mrs. J. L. Gardner, $3.
General Display of Spring Bulbous Plants.— To be arranged with foliage plants:
1st, Weld Garden, $40; 2d, Mrs. J. L. Gardner, $20.
Artistic display of Foliage and Flowering Plants.— Not exceeding 250 sq. ft.:
1st, W. W. Edgar Co., $50; 2d, Mrs. C. G. Weld, $25.
Forced Hardy Shrubs.— To cover not more than 150 sq. ft.:
1st, Weld Garden, $25.

Amateur Classes.

Hyacinths.— Six plants, in one or more pots:
1st, Miss M. A. Rand, $5; 2d, Miss M. A. Rand, $3.
Narcissi.— Twelve plants in one or more pots:
1st, Miss M. A. Rand, Glory of Leiden, $5; 2d, Miss M. A. Rand, Sir Watkin, $3.

Collection of Forced Bulbs.— To cover not more than 12 sq. ft.:
1st, Miss M. A. Rand, $10; 2d, Miss M. A. Rand, $8.
Tulips.— Twelve plants in one or more pots:
1st, Miss M. A. Rand, Goldfinch, $5; 2d, Miss M. A. Rand, Prince of Austria, $3.

Special Prizes offered by the Gardeners' and Florists' Club of Boston.

Cyclamens.— Ten plants:
E. H. Wetterlow, $50.

Special Prizes offered by Charles F. Fairbanks.

Primulas.— Malacoides, eight plants:
1st, Mrs. C. G. Weld, $15; 2d, Miss Cornelia Warren, $10.
Obconica, eight plants:
1st, Mrs. J. L. Gardner, $15.
Tulips.— Darwin. Best display in pots: 1st, Weld Garden, $30.

John Allen French Fund.

Carnations.— Fifty blooms, White:
1st, A. A. Pembroke, $8; 2d, Strouts, $4.
Fifty blooms, Red:
1st, Strouts, Pocahontas, $8; 2d, S. J. Goddard, Beacon, $4.
Fifty blooms, Pink:
1st, A. A. Pembroke, Pink Sensation, $8; 2d, S. J. Goddard, Pink Sensation, $4.
Fifty blooms, Yellow:
1st, Mrs. E. K. Farr, Yellow Prince, $8; 2d, S. J. Goddard, Yellow Prince, $4.
Fifty blooms, Variegated:
1st, S. J. Goddard, Benora, $8; 2d, A. A. Pembroke, Benora, $4.
Orchids.— Cut flowers, arranged for effect, to cover 24 sq. ft.:
1st, E. B. Dane, $20.
Roses.— Twenty-five blooms, Red:
1st, Waban Rose Conservatories, Hadley, $12; 2d, Thomas Roland, Richmond, $6.
Twenty-five blooms, Pink:
1st, Waban Rose Conservatories, Killarney Queen, $12; 2d, Waban Rose Conservatories, Killarney Brilliant, $6.
Twenty-five blooms, any other color:
1st, Waban Rose Conservatories, Mrs. Bayard Thayer, $12.
Sweet Peas.— Twenty-five blooms, White:
1st, William Sim, White Orchid, $4.

Twenty-five blooms, Scarlet:
1st, William Sim, Zvolanek's Red, $4; 2d, William Sim, Zvolanek's Scarlet, $2.
Twenty-five blooms, Pink:
1st, William Sim, Mrs. Skach, $4; 2d, William Sim, Christmas Pink, $2.
Twenty-five blooms, Lavender:
1st, William Sim, Baur's Lavender, $4.
Twenty-five blooms, any other color:
1st, William Sim, Venus, $4; 2d, William Sim, Orange Orchid, $2.
Violets.— One hundred blooms, Single:
1st, Edward Bingham, Princess of Wales, $4; 2d, Esty Bros., Princess of Wales, $2.
One hundred blooms, Double:
1st, Edward Bingham, Lady Hume Campbell, $4; 2d, Oliver Ames, Lady Hume Campbell, $2.

Gratuities:

W. T. Walke, group of flowering and foliage plants, $20.
Mrs. J. L. Gardner, display of Cyclamens, $5.
E. B. Dane, " " " $4.
Weld Garden, " " " $4.
W. T. Walke, specimen Hydrangeas, $10.
Thomas Roland, display of *Erica melanthera*, $10.
Miss Cornelia Warren, specimen *Dendrobium nobile*, $2.
Mrs. J. L. Gardner, Calanthe William Murray, $3.
Boston Cut Flower Co., table decorations and display of plants, $12.
Houghton, Gorney Co., artistic display of cut flowers and plants, $10.
William Sim, collection of Sweet Peas, $5.
T. T. Watt, Tree Peonies, $1.
Osgood Bros., display of Pansy flowers, $2.
Mrs. C. G. Weld, vase of *Leptosyne maritima*, $1.
P. E. Richwagen, 3 vases seedling Antirrhinums, $5.
Mrs. E. K. Farr, vase of Carnation Harry Fenn, $2.
Caplan the Florist, table decoration and display of cut flowers, $8.
H. R. Comley, table decoration and display of Roses and Carnations, $8.

May Exhibition.

May 10, 11, 12, 13, and 14.

Antirrhinums.— Eight plants:
1st, Mrs. C. G. Weld, $12.
Azalea indica.— Group to cover not more than 200 sq. ft.:
1st, A. M. Davenport, $100.

Four plants:
1st, A. M. Davenport, $50; 2d, Miss Cornelia Warren, $25.
Calceolarias.— Large-flowering varieties, eight plants:
1st, Mrs. J. L. Gardner, $15; 2d, E. A. Clark, $8.
Stewartii, six plants:
1st, Winthrop Ames, $15; 2d, Miss Cornelia Warren, $8.
Campanula Medium.— Eight plants:
1st, Miss Cornelia Warren, $15.
Ericas.— Six plants:
1st, Miss Cornelia Warren, $15.
Tree Fern.— One specimen:
1st, Weld Garden, $10; 2d, A. M. Davenport, $5.
Fuchsias.— Four plants:
1st, S. J. Goddard, $12.
Heliotrope.— Standard, six plants:
1st, Faulkner Farm, $15; 2d, W. W. Edgar Co., $8.
Hydrangeas.— Group to cover not less than 150 sq. ft.:
1st, W. W. Edgar Co., $75; 2d, E. A. Clark, $40.
Four plants, not less than two varieties:
1st, W. W. Edgar Co., $25; 2d, W. T. Walke, $12.
Marguerites.— Six plants:
1st, Faulkner Farm, $20; 2d, F. W. Fletcher & Co., $10.
Orchids.— Group arranged for effect, covering 100 sq. ft.:
1st, F. J. Dolansky, $200 and Gold Medal.
Six plants, six varieties:
1st, J. T. Butterworth, $20.
Palms.— Two Arecas:
1st, Weld Garden, $15.
Two Kentias:
1st, Weld Garden, $15; 2d, Mrs. J. L. Gardner, $8.
Two Phoenix Roebellini:
1st, Weld Garden, $15; 2d, Mrs. Lester Leland, $8.
Two specimens, any other variety:
1st, Weld Garden, $15.
Pelargoniums.— Show, twelve plants, not less than six varieties:
1st, Mrs. C. G. Weld, $25.
Six plants, not less than three varieties:
1st, Mrs. C. G. Weld, $10; 2d, Miss Cornelia Warren, $5.
One specimen plant:
1st, Mrs. C. G. Weld, $5; 2d, Miss Cornelia Warren, $3.
Zonale, one specimen plant:
1st, S. J. Goddard, $5.
Rhododendrons.— Group, not exceeding 300 sq. ft.:
1st, Walter Hunnewell, $100.
Group, not exceeding 300 sq. ft., varieties which have grown in Massachusetts without protection for at least five years:
1st, Walter Hunnewell, $100.

One specimen plant:
Walter Hunnewell, $15.

Roses.— Group, to cover not more than 200 sq. ft.:
1st, Thomas Roland, $100.

Hybrid Perpetual, six plants, not less than three varieties:
1st, Miss Cornelia Warren, $10.

Hybrid Perpetual, one specimen plant:
Miss Cornelia Warren, $5.

Rambler, four varieties:
1st, Thomas Roland, $50.

Rambler, one specimen plant:
Thomas Roland, $10.

Schizanthus.— Six plants:
1st, Mrs. C. G. Weld, $12; 2d, Mrs. J. L. Gardner, $6.

Streptocarpus.— Twelve plants:
1st, Mrs. J. L. Gardner, $10; 2d, Mrs. C. G. Weld, $5.

Verbenas.— Eight plants in pots:
1st, Faulkner Farm, $10.

Artistic Display of Foliage and Flowering Plants.— To cover not less than 200 sq. ft.:
1st, A. M. Davenport, $100; 2d, W. W. Edgar Co., $50.

Stove or Greenhouse Foliage Plants.— Six:
1st, N. T. Kidder, $40.

Flowering Plant.— One specimen:
1st, N. T. Kidder, standard Fuchsia, $10; 2d, S. J. Goddard, Anthurium, $5.

Display of Dwarf Japanese Plants:
1st, Weld Garden, $75.

Miniature Japanese Garden:
1st, Kameyama & Serada, $30; 2d, Penn the Florist, $20.

Antirrhinums.— Six vases, twenty-five spikes each, not less than three varieties:
1st, Faulkner Farm, $20; 2d, S. J. Goddard, $10.

One vase, one or more varieties:
1st, P. E. Richwagen, $5; 2d, Mrs. C. G. Weld, $3.

Spanish Iris.— Six vases, twenty-five blooms each, not less than three varieties:
1st, Esty Bros., $10.

Marguerites.— One hundred blooms, Yellow:
1st, James Wheeler, $8.

Narcissi.— Ten vases, ten varieties, ten blooms each:
1st, Mrs. C. S. Minot, $10; 2d, Faulkner Farm, $5.

Pansies.— Display:
1st, William Sim, $10; 2d, C. T. Beasley & Co., $5.

Roses.— Display, covering not more than 100 sq. ft.:
1st, F. R. Pierson Co., $100.

Hybrid Teas, fifty blooms, White:
1st, F. R. Pierson Co., $25; 2d, McAlpine Bros., $15.
Fifty blooms, Red:
1st, Waban Rose Conservatories, Hadley, $25; 2d, McAlpine Bros. Crimson Queen, $15.
Fifty blooms, Pink:
1st, Waban Rose Conservatories, Mrs. Bayard Thayer, $25; 2d, F. R. Pierson Co., Ophelia, $15.
Fifty blooms, Yellow:
1st, F. R. Pierson Co., Mrs. Aaron Ward, $25; 2d, F. R. Pierson Co., Sunburst, $15.
Twelve blooms, Red (for private gardeners only):
1st, Mrs. C. G. Weld, $6.
Twelve blooms, Pink (for private gardeners only):
1st, Mrs. C. G. Weld, Mrs. Charles Russell, $6; 2d, Mrs. C. G. Weld, Mrs. Moorfield Storey, $4.
Twelve blooms, Yellow (for private gardeners only):
1st, Mrs. C. G. Weld, Lady Hillingdon, $6.
Sweet Peas.— Display to cover not more than 50 sq. ft.:
1st, Faulkner Farm, $35.
Tulips.— Twelve vases, twelve varieties, ten blooms each:
1st, Faulkner Farm, $8.
Six vases, six varieties, ten blooms each:
1st, Weld Garden, $5.
Display of Darwin Tulips, not less than 50 sq. ft.:
1st, Weld Garden, $25.

Gratuities:

Mrs. C. G. Weld, group of Schizanthus, $5.
" " " " hanging basket of Fuchsias, $5.
Winthrop Ames, group of *Calceolaria Stewartii*, $15.
T. T. Watt, standard Hydrangea, $5.
E. B. Dane, *Hydrangea otaksa*, $8.
Faulkner Farm, " " $3.
Mrs. J. L. Gardner, Hydrangeas, $2.
E. A. Clark, Astilbe, $5.
Julius Roehrs Co., collection of rare Orchids, $25.
Miss Cornelia Warren, two Orchids, $3.
Blue Hill Nurseries, collection of hardy evergreens, $50 and Silver Medal.
Thomas Roland, *Bougainvillea Sanderiana*, $25 and Silver Medal.
Mrs. J. L. Gardner, Clarkia Salmon Queen, Hydrangea, and Stocks, $3.
Esty Bros., Ixias and Ranunculus, $2.
E. B. Dane, vase of Eschscholtzia, $1.
John Marshall, vase of Hunnemannia, $3.

H. R. Comley, display of plants and flowers, $6.
S. J. Goddard, standard Geranium J. J. Harrison, $5.
Kameyama & Serada, *Lilium longiflorum*, $2.
E. B. Dane, display of flowering and foliage plants, $50.
N. T. Kidder, foliage and flowering plants, $10.
Miss Cornelia Warren, group of flowering plants, $5.
T. T. Watt, flowering plants, $3.

May 27.

Gratuity:

Oliver Ames, display of Darwin and Cottage Tulips, $8 and Honorable Mention.

Peony Exhibition.

June 17 and 18.

H. H. Hunnewell Fund, No. 3.

Rhododendrons.— Largest and best collection, not less than fifteen distinct varieties, six trusses each, from plants that have grown in the open in Massachusetts for at least three years:
1st, T. C. Thurlow's Sons Co., $20.
Twelve distinct varieties, one truss each:
1st, T. C. Thurlow's Sons Co., $6; 2d, W. C. Winter, $4.
Six distinct varieties, one truss each:
1st, Weld Garden, $3.

Josiah Bradlee Fund.

German Irises.— Twenty-four vases of three trusses each, of not less than twelve varieties:
1st, E. M. Dunphe, $5; 2d, H. F. Chase, $3.
Hardy Herbaceous Flowers.— Twenty-five distinct species and varieties, not less than ten genera:
1st, Blue Hill Nurseries, $10.
Twenty distinct species and varieties, not less than eight genera (for private growers only):
1st, Weld Garden, $8.

Society's Prizes.

Herbaceous Peonies.— Collection of twenty named varieties, double, one flower of each:
1st, G. H. Peterson, $12; 2d, A. H. Fewkes, $8.

Collection of ten named varieties, double, three flowers of each:
1st, G. H. Peterson, $12; 2d, Mrs. C. S. Minot, $8.
Specimen bloom, double:
1st, G. N. Smith, $2; 2d, A. H. Fewkes, $1.
Collection of twelve named varieties, single, one bloom of each:
1st, Mrs. J. L. Gardner, $5.
Collection of six named double varieties, White, one flower of each:
1st, G. H. Peterson, $4; 2d, Mrs. C. S. Minot, $2.
Collection of six named double varieties, Rose Pink:
1st, G. H. Peterson, $4; 2d, Mrs C. S. Minot, $2.
Collection of six named double varieties, Salmon Pink:
1st, G. H. Peterson, $4; 2d, S. G. Harris, $2.
Collection of six named double varieties, Red or Crimson:
1st, G. H. Peterson, $4; 2d, S. G. Harris, $2.
Collection of twelve named double varieties, one flower of each (for non-commercial growers only):
1st, Mrs. J. L. Gardner, $8.
Collection of twelve blooms, Pink (for private gardeners only):
1st, Mrs. J. L. Gardner, $4.

Gratuities:

A. H. Fewkes, vase of Peony Mme. Calot, $3.
Mrs. J. L. Gardner, *Paeonia magnifica*, $5.
Wellesley Nurseries, collection of Peonies and Irises, $10.
J. K. Alexander, collection of Irises, $5.
Blue Hill Nurseries, collection of Day Lilies and Irises, $10.
E. B. Dane, display of cut Orchid blooms, $25 and Honorable Mention.
J. T. Butterworth, Orchids in bloom, $7.
Mount Desert Nurseries, artistically arranged group of hardy flowers, $20 and Honorable Mention.
Miss Cornelia Warren, collection of hardy flowers, $3.

Rose and Strawberry Exhibition.

July 1 and 2.

John Allen French Fund.

Hardy Roses.— Collection, named, not less than twenty varieties, filling fifty vases, one rose in each vase:
1st, T. N. Cook, $20; 2d, W. C. Winter, $15.

John C. Chaffin Fund.

Roses.— Best three blooms of any White Hybrid Perpetual Rose (for amateurs only):
1st, David Tyndall, $4; 2d, Robert Seaver, $2.
Best three blooms, Pink (for amateurs only):
1st, David Tyndall, $4; 2d, E. K. Butler, $2.
Best three blooms, Red (for amateurs only):
1st, David Tyndall, $4; 2d, David Tyndall, $2.
Basket of Hybrid Perpetual Roses, artistically arranged:
1st, Robert Seaver, $4; 2d, Robert Seaver, $2.
Twenty-four named varieties, one of each:
1st, T. N. Cook, $10.
Twelve named varieties, one of each:
1st, A. W. Preston, $5; 2d, J. B. Wills, $4.
Six named varieties, one of each:
1st, Robert Seaver, $4; 2d, A. W. Preston, $2.

John A. Lowell Fund.

Hybrid Tea Roses.— Collection of twelve varieties, one bloom of each:
1st, A. W. Preston, $10; 2d, E. K. Butler, $6.
Best three blooms of a Hybrid Tea variety introduced since 1913:
A. W. Preston, Crissie McKellar, $5.
Six blooms, any White variety:
1st, T. N. Cook, Killarney, $4; 2d, G. E. Barnard, Kaiserin Augusta Victoria, $2.
Six blooms, any Yellow variety:
1st, A. W. Preston, Mme. Melanie Soupert, $4; 2d, G. E. Barnard, Mrs. Aaron Ward, $2.
Six blooms, any Pink variety:
1st, A. W. Preston, Duke of Westminster, $4; 2d, A. W. Preston, $2.
Six blooms, any Red variety:
1st, A. W. Preston, George Dickson, $4; 2d, T. N. Cook, George Dickson, $2.
Basket, artistically arranged:
1st, Mrs. Albert Geiger, Jr., $5.
Sweet Williams.— Display, eighteen vases of three trusses each, not less than six varieties:
1st, Mrs. J. L. Gardner, $6; 2d, Mrs. C. G. Weld, $4.
Hardy Herbaceous Flowers.— Twenty-five vases, distinct species and varieties, not less than ten genera (for private growers only):
1st, Weld Garden, $10.
Campanula Medium.— Collection, filling twelve vases, one color in a vase:
1st, Weld Garden, $8; 2d, Mrs. C. G. Weld, $6.

Gratuitues:

T. N. Cook, collection of Roses, $8.
Mrs. C. G. Weld, display of hardy Roses, $5.
Miss Cornelia Warren, " " " " $3.
Eastern Nurseries, collection of climbing Roses, $2.
J. T. Butterworth, Hybrid Perpetual Roses, $2.
T. C. Thurlow's Sons Co., display of Peonies, $20.
A. H. Fewkes, collection of Peonies, $3.
Miss Cornelia Warren, *Campanula persicifolia*, $3.
Weld Garden, Digitalis in variety, $5.
Miss Cornelia Warren, Gloxinias, $2.
F. W. Fletcher Co., Delphinium Clivedon Beauty, $2.
E. B. Dane, collection of Orchid blooms, $20.
J. T. Butterworth, Orchid plant in bloom, $6.
Miss Cornelia Warren, display of Oncidiums, $8.
Eastern Nurseries, collection of herbaceous flowers, $3.
Mrs. E. S. Martin, vase of cut flowers, $1.

Sweet Pea Exhibition.

July 8 and 9.

John Allen French Fund.

Sweet Peas.— Twenty-five sprays, any White variety:
1st, Mrs. Robert Winthrop, Constance Hinton, $4; 2d, Edwin Jenkins, Edna May Improved, $2.
Twenty-five sprays, any Crimson or Scarlet:
1st, Edwin Jenkins, Sunproof Crimson, $4; 2d, Mrs. Robert Winthrop, Scarlet Emperor, $2.
Twenty-five sprays, any Carmine:
1st, Mrs. Robert Winthrop, Rosabelle, $4; 2d, Edwin Jenkins, George Herbert, $2.
Twenty-five sprays, any Yellow:
1st, A. N. Cooley, Mrs. Dameron, $4; 2d, Mrs. C. G. Weld, Mrs. Dameron, $2.
Twenty-five sprays, any Blue:
1st, Mrs. Robert Winthrop, Blue Monarch, $4; 2d, Edwin Jenkins, Blue Monarch, $2.
Twenty-five sprays, any Blush:
1st, Mrs. Robert Winthrop, Lady Evelyn Eyre, $4; 2d, Stuart Duncan, Agricola, $2.

Twenty-five sprays, any Deep Pink:
1st, Mrs. Robert Winthrop, Hercules, $4; 2d, Edwin Jenkins, Hercules, $2.

Twenty-five sprays, any Cream Pink:
1st, Stuart Duncan, Mrs. Hugh Dickson, $4; 2d, Stuart Duncan, Miriam Beaver, $2.

Twenty-five sprays, any Orange:
1st, Mrs. Robert Winthrop, Mary Unwin, $4; 2d, A. N. Cooley, Mary Unwin, $2.

Twenty-five sprays, any Lavender:
1st, Stuart Duncan, Orchid, $4; 2d, Edwin Jenkins, Don Alvar, $2.

Twenty-five sprays, any Purple:
1st, Mrs. Robert Winthrop, Royal Purple, $4; 2d, Stuart Duncan, Royal Purple, $2.

Twenty-five sprays, any Maroon:
1st, Stuart Duncan, John Ridd, $4; 2d, Mrs. Robert Winthrop, King Manoel, $2.

Twenty-five sprays, any Picotee edged:
1st, Mrs. Robert Winthrop, Jean Ireland, $4; 2d, A. N. Cooley, Dobbie's Blue Picotee, $2.

Twenty-five sprays, any Striped or Flaked Red or Rose:
1st, Edwin Jenkins, Jessie Cuthbertson, $4; 2d, Mrs. Robert Winthrop, Jessie Cuthbertson, $2.

Twenty-five sprays, any Striped or Flaked Blue or Purple:
1st, Mrs. Robert Winthrop, Bertha Usher, $4; 2d, A. N. Cooley, Bertha Usher, $2.

Twenty-five sprays, any Bicolor, other than Picotee-edged:
1st, Mrs. Robert Winthrop, Mrs. Cuthbertson, $4; 2d, A. N. Cooley, Mrs. Cuthbertson, $2.

Iris Kaempferi.— Collection of not less than six varieties, filling twenty-five vases:
1st, A. J. Jenkins, $8.

Society's Prizes.

(For amateurs only.)

Sweet Peas.— Best vase, White, twelve sprays to a vase:
1st, Thomas Burrows, Edna May, $3; 2d, Thomas Brook, Constance Hinton, $2.

Best vase, Pink:
1st, Thomas Brook, Hercules, $3; 2d, Mrs. P. G. Forbes, Miriam Beaver, $2.

Best vase, Dark Pink:
1st, Margaret J. Miller, George Herbert, $3; 2d, Willo Blossom, George Herbert, $2.

Best vase, Lavender:
1st, Thomas Brook, R. F. Felton, $3; 2d, Mrs. P. G. Forbes, Florence Nightingale, $2.
Best vase, Salmon:
1st, Margaret J. Miller, Barbara, $3; 2d, Miss R. V. Cook, Salmon Pink, $2.
Best vase, Crimson:
1st, Thomas Brook, Sunproof Crimson, $3; 2d, Miss R. V. Cook, $2.
Best Vase, Primrose:
1st, Thomas Brook, Dobbie's Cream, $3; 2d, Thomas Burrows, Floradale Fairy, $2.
Best vase, Scarlet:
1st, Thomas Brook, The President, $3; 2d, Margaret J. Miller, Fiery Cross, $2.
Best vase, any other color:
1st, Thomas Burrows, King Manoel, $3; 2d, Thomas Brook, Royal Purple, $2.
Wild Flowers.— Collection, named, one or more bottles of each kind:
1st, Albert Davidson, $5; 2d, Mrs. F. C. Upham, $4.

Gratuities:

Albert Jenkins, display of Sweet Peas, $15.
Mrs. W. G. Weld, " " " " $10.
Thomas Burrows, " " " " $2.
Margaret J. Miller, " " " " $2.
G. E. Barnard, " " " " $2.
Miss R. V. Cook, basket of Sweet Peas, $1.
A. W. Preston, display of Tea and Hybrid Tea Roses, $7.
Oliver Ames, vase of *Trachelium caeruleum*, $1.
Blue Hill Nurseries, display of hardy herbaceous flowers, $15.

July 15.

Hollyhocks.— Twenty-four blooms, not less than four varieties:
1st, W. G. Kendall, $4.
Twelve spikes:
1st, W. G. Kendall, $4.

Gratuity:

Eastern Nurseries, display of hardy herbaceous flowers, $6.

Gladiolus Exhibition.

August 11, 12, and 13.

Begonias, Tuberous Rooted.— Six plants:
1st, Weld Garden, $6.

Perennial Phloxes.— Twelve named varieties:
1st, Blue Hill Nurseries, $5; 2d, T. C. Thurlow's Sons Co., $4.

Gladioli.— Vase of twenty-five spikes, White, one variety:
1st, C. F. Fairbanks, Europa, $10; 2d, J. Thoman & Sons Co., Rochester White, $5.

Vase of twenty-five spikes, Red:
1st, C. F. Fairbanks, Red Emperor, $10; 2d, T. A. Havemeyer, Liebesfeuer, $5.

Vase of twenty-five spikes, Crimson:
1st, J. L. Childs, Rich Red, $10; 2d, C. W. Brown & Son, $5.

Vase of twenty-five spikes, Pink:
1st, T. A. Havemeyer, Panama, $10; 2d, C. F. Fairbanks, Panama, $5.

Vase of twenty-five spikes, Yellow:
1st, J. L. Childs, Sulphur King, $10; 2d, S. E. Spencer, Schwaben, $5.

Vase of twenty-five spikes, any other color:
1st, T. A. Havemeyer, Muriel, $10; 2d, C. F. Fairbanks, Mary Fennell, $5.

Vase of twenty-five spikes, any Lemoinei hybrid:
1st, T. A. Havemeyer, $10; 2d, J. L. Childs, Baron Hulot, $5.

Vase of twenty-five spikes, any Primulinus hybrid:
1st, C. F. Fairbanks, $10; 2d, C. W. Brown & Son, $5.

Largest and best collection of named varieties, one spike of each:
1st, J. L. Childs, $50; 2d, C. F. Fairbanks, $25.

Collection of fifty named varieties, one spike of each:
1st, T. A. Havemeyer, $20; 2d, J. L. Childs, $10.

Vase of six spikes, White, one variety:
1st, T. A. Havemeyer, Europa, $4; 2d, Jelle Roos, $2.

Vase of six spikes, Red:
1st, T. A. Havemeyer, Red Emperor, $4; 2d, John Zeestraten, Electra, $2.

Vase of six spikes, Crimson:
1st, J. L. Childs, George Paul, $4; 2d, Jelle Roos, Czar Peter, $2.

Vase of six spikes, Pink:
1st, John Zeestraten, Panama, $4; 2d, H. E. Meader, Myrtle, $2.

Vase of six spikes, Yellow:
1st, E. M. Smith, Schwaben, $4; 2d, C. F. Fairbanks, Schwaben, $2.

Vase of six spikes, any other color:
1st, T. A. Havemeyer, Loveliness, $4; 2d, C. F. Fairbanks, Julie Fairbanks, $2.
Vase of six spikes, any Lemoinei hybrid:
1st, H. E. Meader, Heliotrope, $4; 2d, T. A. Havemayer, Duval, $2.
Vase of six spikes any Primulinus hybrid:
1st, C. W. Brown & Son, $4; 2d, J. L. Childs, $2.
Vase of three spikes, White:
1st, Thomas Coggar, Europa, $2; 2d, Madison Cooper, Mrs. L. M. Gage, $1.
Vase of three spikes, Red:
1st, C. F. Fairbanks, $2; 2d, E. M. Smith, $1.
Vase of three spikes, Crimson:
1st, E. M. Smith, Red Amaryllis, $2; 2d, Jelle Roos, Rajah, $1.
Vase of three spikes, Yellow:
1st, Madison Cooper, Yellow Bird, $2; 2d, E. M. Smith, Niagara, $1.
Vase of three spikes, any other color:
1st, J. L. Childs, $2; 2d, E. M. Smith, Myrtle, $1.
Twelve vases, twelve named varieties, one spike of each:
1st, Iristhorpe Farm, $6; 2d, H. E. Meader, $3.
One vase, ten spikes, one variety (for amateurs only):
1st, Madison Cooper, Loveliness, $5; 2d, L. M. Fuller, Halley, $3.
Twenty-five spikes artistically arranged:
1st, J. Thoman & Sons, Rochester White, $10; 2d, E. N. Fisher, $5.

Charles F. Fairbanks Special Prizes.

Best Seedling Gladiolus, one spike:
1st, J. L. Childs, Seedling no. 3, $25; 2d, T. A. Havemeyer, Yellow Seedling, $10.

Gratuities:

Brookland Gardens, display of Gladioli, $15.
Thomas Coggar, " " " $10.
L. M. Gage, " " " $10.
C. W. Brown, " " " $5.
R. W. Swett, " " " $5.
J. K. Alexander, " " " $4.
Blue Hill Nurseries, display of hardy herbaceous flowers, $8.
Mrs. E. M. Gill, display of hardy flowers, $2.

Dahlia and Fruit Exhibition.

September 9 and 10.

Dahlias.— Show and Fancy, twelve blooms, named varieties:
1st, W. D. Hathaway, $3; 2d, G. L. Stillman, $2.
Cactus, twelve blooms, named varieties:
1st, W. D. Hathaway, $3; 2d, G. L. Stillman, $2.
Decorative, twelve blooms, named varieties:
1st, W. F. Hall, $3; 2d, A. W. Hayden, $2.
Peony-flowered, 12 blooms, named varieties:
1st, W. D. Hathaway, $3; 2d, G. L. Stillman, $2.
Pompon, twelve vases of three blooms each, named varieties:
1st, F. P. Webber, $3; 2d, W. D. Hathaway, $2.
Largest and best collection of named varieties, one vase of each:
1st, J. K. Alexander, $8.

Hardy Herbaceous Flowers.— Thirty bottles, distinct species and varieties, not less than ten genera (for private gardeners only):
1st, Faulkner Farm, $10.

Wild Flowers.— Collection, correctly named as far as possible, one bottle of each kind:
1st, L. D. Watson, $5; 2d, K. R. Craig, $4; 3d, Albert Davidson, $3; 4th, Mary M. Wheeler, $2.

Gratuities:

Mrs. L. A. Towle, display of Dahlias, $2.
G. L. Stillman, " " " $2.
J. K. Alexander, display of Gladioli, $8.
Wrentham Dahlia Gardens, " " " $2.
Blue Hill Nurseries, display of herbaceous perennials, $5.

Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables.

November 1, 2, 3, 4, and 5.

Foliage and Flowering Plants.— Best arranged group covering 300 sq. ft.:
1st, A. M. Davenport, $100; 2d, W. W. Edgar Co., $50.
Best arranged group covering 150 sq. ft. (for private gardeners only);
1st, Mrs. J. L. Gardner, $50.

Orchid.— Best specimen:
1st, A. W. Preston, $8; 2d, N. T. Kidder, $6.
Orange Plants.— Six:
1st, W. W. Edgar Co., $10.
Chrysanthemums.— Group to cover 200 sq. ft.:
1st, A. M. Davenport, $100; 2d, Mrs. J. L. Gardner, $50.
Six trained specimen plants, any color or class:
1st, J. S. Bailey, $50.
One trained specimen plant, White:
1st, G. L. Stone, Garza, $15; 2d, Mrs. C. G. Weld, Garza, $10.
One trained specimen plant, Bronze:
1st, W. H. Wellington, Hortus Tolosanus, $15; 2d, W. H. Wellington, Mrs. William Duckham, $10.
Display, arranged with foliage plants, to cover not less than 100 sq. ft. (for commercial growers only):
1st, W. H. Elliott, $50; 2d, Kameyama & Serada, $25.
Palms.— Two Kentias:
1st, Mrs. J. L. Gardner, $12.
Begonias.— Gloire de Lorraine or any of its varieties, six plants:
1st, Mrs. Lester Leland, $25; 2d, G. L. Stone, $12.
Any other winter-flowering variety, six plants:
1st, E. S. Webster, Optima, $10.
Best Chrysanthemum plant on exhibition:
G. L. Stone, Garza, $20.

Henry A. Gane Memorial Fund.

Chrysanthemums.— For the best vase of blooms of the Mrs. Jerome Jones or the Yellow Mrs. Jerome Jones:
1st, James Nicol, $30.
For the best new seedling Chrysanthemum originated by any grower:
Nathan Smith & Sons, Miss Anola Wright, $15.

Society's Prizes.

Twenty-five blooms, twenty-five distinct named varieties:
1st, G. L. Stone, $30; 2d, W. H. Wellington, $15.
Twelve blooms, Japanese, named, in vases:
1st, G. L. Stone, $10; 2d, W. H. Wellington, $5.
Twelve blooms, Japanese Incurved:
1st, G. L. Stone, $10.
Twelve blooms, Reflexed:
1st, G. L. Stone, $10.
Twelve vases, Pompon, distinct varieties, six sprays in a vase:
1st, C. H. Totty, $5; 2d, E. K. Butler, $3.

Vase of ten blooms on long stems, Pink, named: 1st, Mrs. Lester Leland, $12; 2d, R. E. Traiser, $8.
Vase of ten blooms on long stems, Red:
1st, Mrs. Lester Leland, $12.
Vase of ten blooms on long stems, White:
1st, James Nicol, $12; 2d, R. E. Traiser, $8.
Vase of ten blooms on long stems, Yellow:
1st, Mrs. Lester Leland, $12; 2d, R. E. Traiser, $8.
Vase of twenty-five blooms, one or more varieties:
Mrs. Alice Sias, $25.
Collection of sprays of single Chrysanthemums filling twenty-five vases:
1st, C. H. Totty, $15; 2d, Scott Bros., $10.
Most artistic vase of Chrysanthemums with any foliage:
1st, W. W. Edgar Co., Robert Halliday, $30; 2d, W. W. Edgar Co., Chieftain, $15.
For the best display showing the various ways flowers can be used for home decoration:
Caplan the Florist, $50.

Carnations.— Six vases, fifty blooms each:
1st, Strouts, $30; 2d, A. A. Pembroke, $15.
One hundred blooms, mixed varieties:
1st, J. W. Minot, $15; 2d, A. A. Pembroke, $8.
Twenty-five blooms, mixed varieties (for private gardeners only):
1st, W. H. Wellington, $5; 2d, Mrs. Alice Sias, $3.

Gratuities:

Kamayama & Serada, group of flowering and foliage plants, $25.
Thomas Roland, " " " " " " $20.
Miss Cornelia Warren, flowering and foliage plants, $6.
G. L. Stone, trained Chrysanthemum, $5.
Mrs. C. G. Weld, " " $5.
A. N. Pierson, collection of cut Chrysanthemums, $10.
C. H. Totty, collection of cut Chrysanthemums, $5.
Mrs. C. G. Weld, display of winter-flowering Begonias, $15 and Silver Medal.
Mrs. J. M. Sears, collection of winter-flowering Begonias, $6.
Waban Rose Conservatories, Roses Mrs. Charles Russell and Hadley, $10.
Blue Hill Nurseries, seedling Evergreens, $5 and Honorable Mention.

Additional Awards.

Gold Medal.

March 17. R. & J. Farquhar & Co., Spring Flower Garden.
May 10. Charles Sander, group of Azaleas.

August 11. C. F. Fairbanks, for advancement in the cultivation and exhibition of the Gladiolus.

Silver Medal.

March 17. E. B. Dane, *Odontioda Bradshawiae* (*Odontoglossum crispum* × *Cochlioda Noetzliana*).
May 10. A. W. Preston, *Brasso-Cattleya Maroniae* (*Cattleya gigas* × *Brasso-Cattleya Digbyana*).
" " Albert Roper Estate, Carnation Albert Roper.
" " James Wheeler, superior cultivation of Marguerite Étoile d'Or.
" " Weld Garden, group of Japanese dwarf plants.
" " Penn the Florist, arrangement of flowers for home use.
" " Walter Hunnewell, *Rhododendron sinense.*
May 27. Bayard Thayer, *Lilium Willmottiae.*
June 17. Miss Grace Sturtevant, Iris Avalon.
" " R. & J. Farquhar & Co., display of hardy herbaceous flowers and shrubs.
July 1. A. J. Fish, collection of climbing hardy Roses.
July 8. S. W. Carlquist, collection of Sweet Peas.
July 15. Iristhorpe Farm, display of *Iris Kaempferi.*
August 26. L. M. Gage, *Gladiolus gandavensis* Mrs. Dr. Norton.
September 9. J. P. Rooney, Peony-flowered Dahlia Mrs. Frederick Grinnell.
" " Fottler, Fiske, Rawson Co., display of Gladioli and Dahlias.
November 1. A. W. Preston, Cattleya Lord Rothschild alba.
" " E. S. Webster, Begonia Optima.
" " E. H. Wetterlow, Begonia Mrs. Peterson.
" 25. Henry Stewart, superior cultivation of *Oncidium varicosum Rogersii.*

First Class Certificate of Merit.

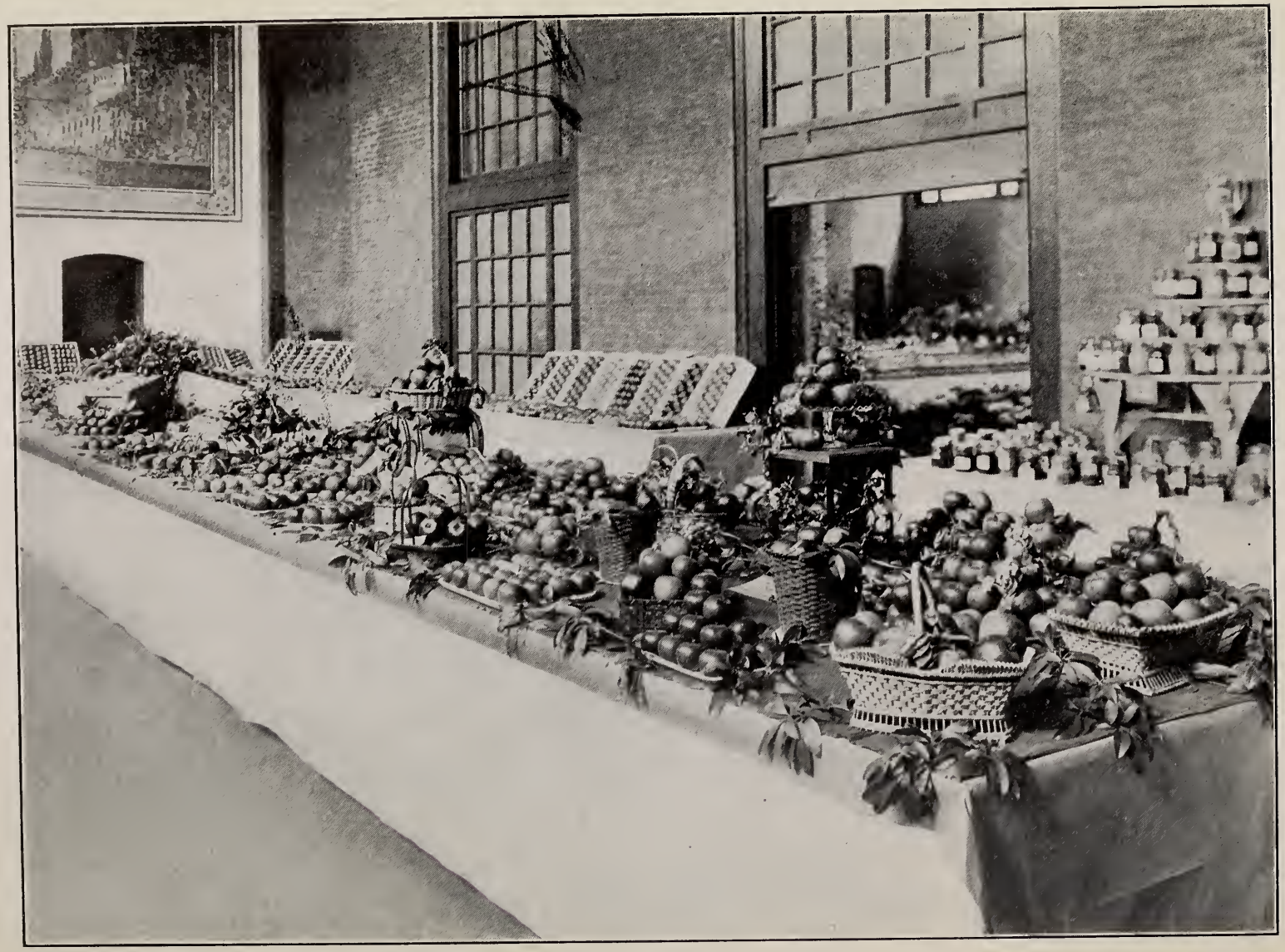
March 17. Mrs. C. G. Weld, vase of Antirrhinum Weld Pink.
" " Walter Hunnewell, superior cultivation of Dendrobiums.
" " T. H. Lemon Co., *Primula malacoides rosea.*
May 10. S. J. Goddard, Carnation Doris.
June 10. Miss Grace Sturtevant, Iris Merlin (Oriflamme × Iris King).
" " " " " " Mme. Cheri (Caterina × Mrs. G. Darwin).
June 17. " " " " Stanley H. White (Hector × Caterina).
July 1. Weld Garden, *Coelogyne Mooreana.*
September 9. E. W. Bennett, Decorative Dahlia Meritorious.
November 1. A. W. Preston, Cattleya Fabia alba.

Cultural Certificate.

March 17. Donald McKenzie, *Sophro-Cattleya Thwaitesii.*
May 10. C. S. Sargent, *Cytopodium punctatum.*

Honorable Mention.

March 17. A. N. Pierson, vase of Rose Lady Alice Stanley.
" " " " " " " " Red Radiance.
" " W. R. Nicholson, seedling Carnation, No. 51.
" " F. Dorner & Sons Co., vase of seedling Carnations.
" " S. J. Goddard, vase of Carnation Doris.
" " A. W. Preston, Cineraria (stellata × Salem Prize).
May 10. Peirce Bros., new Rose Tip Top.
" " E. H. Wetterlow, new Geranium Mrs. Lester Leland.
" " Walter Hunnewell, seedling Orchid: Laelio-Cattleya Waban.
" " F. W. Fletcher & Co., Delphinium Clivedon Beauty.
" " C. S. Sargent, group of *Rehmannia angulata* Pink Perfection.
" " " " " seedling Rhododendron (*R. Smirnowii* × garden variety).
May 27. Miss Grace Sturtevant, display of Hybrid Irises.
June 10. " " " Iris Empire (Monsignor × Aurea).
" " " " " " Niverna (Cypriana × Mrs. G. Darwin).
" " " " " " Hope.
June 17. R. & J. Farquhar & Co., collection of Fuchsias.
" " Miss Grace Sturtevant, Iris Ann Leslie (Dr. Bernice seedling).
" " Blue Hill Nurseries, vase of *Thalictrum aquilegifolium purpureum.*
July 1. H. F. Chase, seedling Peony Miriam.
" " T. N. Cook, new seedling Rambler Rose, No. 1.
July 15. Eastern Nurseries, display of hardy Spiraeas.
" " Dr. and Mrs. Harris Kennedy, display of Japanese Iris.
" " R. & J. Farquhar & Co., display of *Lilium regale.*
August 11. J. L. Childs, Gladiolus Evelyn Kirtland.
" " C. W. Brown, vase of Gladiolus Evaline.
October 7. Mount Desert Nurseries, display of hardy Asters and other herbaceous flowers.
" " T. T. Watt, vase of *Quisqualis parviflora.*
November 7. Mrs. J. M. Sears, Begonia Sylvia.
" " Mrs. C. G. Weld, Begonia Apricot.
" " C. H. Totty, new Geranium Wm. H. Waite. Chrysanthe
" " C. E. Holbrow, seedling Rose (Christie Miller × Richmond).
" " Strouts, Carnation, No. 9.
" " " seedling white Carnation.
" " A. A. Pembroke, Carnation, sport of Benora.



A Portion of the Fruit Exhibition, November 1, 1916

REPORT OF THE COMMITTEE ON FRUITS FOR THE YEAR 1916.

By Edward B. Wilder, Chairman.

The peculiar atmospheric conditions had a very serious effect upon the fruit crop during the year. The heavy rains of the Spring and continued moisture prevented the foliage from thoroughly drying off and rendered spraying far less effective than usual.

The sooty fungus on the apples, a result of these conditions, has been very bad, much worse than for years. The lateness of the season caused the postponement of the Rose and Strawberry Exhibition to July 1st and the extension of the Fruit Schedule in the Sweet Pea Exhibition to July 15th.

Nevertheless, we had a good display of fruit at the Strawberry Exhibition consisting of seventy-five dishes of strawberries and twelve of cherries. The new arrangement of the berries on plates with their own foliage has been a great success and should be continued and improved.

It was encouraging to see more entries in the classes for foreign grapes, exhibits being made at the Gladiolus, Dahlia and Fruit, and Grand Autumn Exhibitions.

The October Show was very good when we consider the fact that many of the chief features had been transferred this year to the November Exhibition. Apples, pears, grapes, and other fruit occupied a large part of the main hall and the increase in the display of pears, and the fine collections of grapes were very encouraging.

The display of fruit at the Grand Autumn Exhibition, November 1–5, was by far the finest of the year and was without doubt the chief feature of the exhibition and the most attractive exhibit in recent years.

The tables of apples "arranged for decorative effect" in the small hall were greatly appreciated by the public, as were the very fine groups and single dishes of apples.

In the main hall were tables of pears, grapes, and quinces, and large collections of apples in the lecture hall. A noteworthy feature of this exhibition was the display of the "Peasgood's Nonesuch" apple by Mrs. Harry F. Fay of Lexington, Mass. This is an apple of English origin and averaged more than a pound apiece. They were grown on dwarf stock and the crop this year on one tree was 110 apples. There is no record of any previous exhibition of this variety of apple.

The good work done by this and other Societies in raising the requirements has largely eliminated the San José scale and discouraged the display of fruit with other blemishes.

We feel that this Society is falling behind and losing ground in its present narrow views for the fruit schedule and exhibitions.

The elimination of the third prize discourages the amateur and other exhibitors from doing their best, for if they go to the expense and labor of preparing an exhibit, be it a dish of twelve specimens or a collection and are just a little behind second prize, their labor and expense is in vain.

We have had exhibitors who come here, took third prize, received instruction and education, and went home encouraged to raise such fine fruit that they could take first prize with credit.

We also feel that the schedule of prizes should be arranged to give the fruits and vegetables a just and honest share of the prize money and not have their departments constantly reduced in favor of another.

All these and other things are against the broad policy established by the founders of this grand old Society and are estranging not only exhibitors but stanch members, whom we cannot afford to lose if we desire to continue the beneficent work done in the years gone by.

Edward B. Wilder
William Downs
Ralph W. Rees
} *Committee on Fruits.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1916.

Spring Exhibition.

March 17, 18, and 19.

Winter Apples.— Collection of not less than four varieties:
1st, D. R. Craig, $6.
Plate of one variety:
2d, Baker Farm, Northern Spy, $2.
Pears.— Plate of any variety:
1st, F. W. Dahl, Anjou, $3.

May Exhibition.

May 10, 11, 12, 13, and 14.

Gratuity:

N. T. Kidder, Roxbury Russet Apples, $1.

Rose and Strawberry Exhibition.

July 1 and 2.

Strawberries.— For the best collection of ten plates of 48 berries each, not less than six varieties:
1st, Wilfrid Wheeler, $25.
Six plates of 24 berries each, six varieties:
1st, G. V. Fletcher, $5; 2d, Wilfrid Wheeler, $4.
Two plates of 24 berries each, of any variety introduced since 1912:
1st, Louis Graton, St. Martin, $4.
For the best two plates of 48 berries each, of any variety:
1st, Louis Graton, St. Martin, $8; 2d, E. M. Brewer, Brewer, $6.
For the best three plates of 24 berries each, three varieties, arranged with their own foliage:
1st, Louis Graton, $5; 2d, W. C. Winter, $4.

For the best single plate of any variety, 24 berries, arranged with their own foliage:
1st, G. V. Fletcher, Marshall, $3; 2d, Louis Graton, St. Martin, $2.
Two plates of Barrymore: 24 berries each:
1st, Wilfrid Wheeler, $3; 2d, G. V. Fletcher, $2.
Two plates of Black Beauty:
1st, G. V. Fletcher, $3.
Two plates of Chesapeake:
1st, Louis Graton, $3.
Two plates of Golden Gate:
1st, W. C. Cooper, $3.
Two plates of Marshall:
1st, G. V. Fletcher, $3.
Two plates of Minute Man:
1st, Wilfrid Wheeler, $3.
Two plates of Senator Dunlap:
2d, G. V. Fletcher, $2.
Two plates of any other variety:
1st, Louis Graton, Brandywine, $3.
Cherries.— Two plates, 24 specimens each, of any Red variety:
1st, F. W. Dahl, Early Sweet, $3.
Two plates of any Black variety:
1st, G. V. Fletcher, Guigne Noire, $3.
Two plates of any White or Yellow variety:
1st, J. H. Fletcher, Royal Ann, $3; 2d, F. W. Dahl, White Heart, $2.
Best fruited branch of Cherries:
1st, F. W. Dahl, White Heart, $3; 2d, F. W. Dahl, Early Sweet, $2.

Gratuity:

Wilfrid Wheeler, collection of Strawberries, $2.

Sweet Pea Exhibition.

July 8 and 9.

Theodore Lyman Fund, No. 1.

Cherries.— Any Red variety, 96 specimens:
1st, E. B. Wilder, Downer, $3; 2d, F. W. Dahl, Early Sweet, $2.
Any White or Yellow variety:
1st, F. W. Dahl, White Heart, $3; 2d, Mrs. M. J. Merrill, Royal Ann, $2.
Any Black variety:
1st, G. V. Fletcher, Black Tartarian, $3.

Gratuities:

John Bauernfeind, collection of Gooseberries, $2.
Oliver Ames, Gooseberries, $1.
Samuel McMullen, " $1.
Oliver Ames, collection of Currants, $3.

JULY 15.

Theodore Lyman Fund, No. 1.

RASPBERRIES.— Cuthbert, 96 berries:
1st, Hillcrest Farm, $3.
Any other Red variety:
1st, Hillcrest Farm, June Bearer, $3.
Any White variety:
1st, E. B. Wilder, Souchette Blanc, $3.

Society's Prizes.

CURRANTS.— Fay's, 48 bunches:
1st, E. M. Brewer, $3; 2d, Oliver Ames, $2.
Perfection:
1st, Oliver Ames, $3.
Wilder:
1st, John Bauernfeind, $3.
Any other Red variety:
1st, Oliver Ames, Cherry, $3.
White Grape:
1st, Oliver Ames, $3; 2d, W. G. Kendall, $2.
Any other White variety:
1st, W. C. Winter, White Dutch, $3.
GOOSEBERRIES.— Columbus, 48 berries:
1st, W. G. Kendall, $3; 2d, W. C. Winter, $2.
Downing:
1st, W. G. Kendall, $3; 2d, John Bauernfeind, $2.
Industry:
1st, W. G. Kendall, $3.
Triumph:
1st, John Bauernfeind, $3.
Any other variety:
1st, W. G. Kendall, Bates, $3; 2d, W. G. Kendall, Chautauqua, $2.
Collection of six plates, 48 berries each:
1st, W. G. Kendall, $5; 2d, W. C. Winter, $4.

Gratuities:

Louis Graton, St. Martin Strawberry, $2.
Hillcrest Farm, Raspberries, $1.

Gladiolus Exhibition.

August 11, 12, and 13.

Samuel Appleton Fund.

Apples.— Best collection of Summer Apples:
2d, M. S. Wheeler, $8.
Best four varieties of Summer Apples:
1st, H. A. Clark, $8; 2d, M. S. Wheeler, $6.
Best single plate of Summer Apples:
1st, G. V. Fletcher, Sweet Bough, $3; 2d, M. S. Wheeler, Red Astrachan, $2.

Society's Prizes.

Pears.— Clapp's Favorite:
1st, G. V. Fletcher, $3; 2d, F. W. Dahl, $2.
Any other variety:
1st, W. C. Winter, Giffard, $3; 2d, F. W. Dahl, Dearborn Seedling, $2.
Peaches.— Greensboro:
1st, G. V. Fletcher, $3.
Any other variety:
1st, H. A. Clark, Mayflower, $3; 2d, G. V. Fletcher, Triumph, $2.
Six specimens, one variety:
1st, Weld Garden, Princess of Wales, $5; 2d, H. A. Clark, Mayflower, $4.
Nectarines.— Six specimens, one variety:
1st, Weld Garden, Pineapple, $5.
Plums, Japanese.— Any variety:
1st, E. L. Lewis, Red June, $3; 2d, M. S. Wheeler, Red June, $2.
Blackberries.— Any variety, 48 berries:
1st, W. C. Winter, Erie, $3; 2d, F. W. Dahl, Wilson, Jr., $2.
Blueberries.— 100 berries.
1st, C. H. Chamberlain, $3; 2d, M. S. Wheeler, $2.

John S. Farlow Newton Horticultural Society Fund.

Hothouse Fruits.

Grapes.— Black Hamburgh, two bunches:
1st, Weld Garden, $6.
Muscat of Alexandria:
1st, Weld Garden, $6.

Any other variety:
1st, Weld Garden, Madresfield Court Muscat, $6.

Gratuities:

Jennison's Floral Gardens, collection of seedling Blueberries, $2.
Hillcrest Farm, Japanese Wineberry, $1.
Jennison's Floral Gardens, Ideal Everbearing Strawberry, $1.
J. W. Brown & Son, collection of berries, $1.

Dahlia and Fruit Exhibition.

September 9 and 10.

John S. Farlow Newton Horticultural Society Fund.

Foreign Grapes.— Collection of not less than four varieties, two bunches each:
1st, Mrs. J. C. Whitin, $25.
Two bunches, Black:
1st, Mrs. J. C. Whitin, Black Alicante, $6.
Two bunches, White:
1st, Mrs. J. C. Whitin, Mrs. Pearson, $6.

Josiah Bradlee Fund.

Apples.— For the best collection of six varieties of Fall Apples:
1st, M. S. Wheeler, $10; 2d, Parker Bros., $8.

Benjamin V. French Fund, No. 1.

Peaches.— For the largest and best collection of native Peaches:
1st, H. A. Clark, $10; 2d, G. V. Fletcher, $6.

Marshall P. Wilder Fund.

Pears.— Bartlett:
1st, Mrs. Elbridge Torrey, $3; 2d, W. Heustis & Son, $2.
Clapp's Favorite:
1st, Mrs. Elbridge Torrey, $3; 2d, A. B. Howard & Son, $2.
Any other variety:
1st, F. W. Dahl, Dearborn Seedling, $3; 2d, W. Heustis & Son, Bonne d'Ezee, $2.

Society's Prizes.

Apples.— Best collection of Fall Apples:
1st, M. S. Wheeler, $15; 2d, Parker Bros., $10.
Best plate of Fall Apples:
1st, H. A. Clark, Gravenstein, $3; 2d, M. S. Wheeler, Red Astrachan, $2.
Melons.— Mrs. H. H. Rogers, three specimens:
1st, A. W. Preston, $3.
Peaches.— Belle of Georgia:
1st, H. A. Clark, $3; 2d, F. H. Evans, $2.
Carman:
1st, H. A. Clark, $3; 2d, F. H. Evans, $2.
Champion:
1st, H. A. Clark, $3; 2d, Louis Graton, $2.
Any other variety:
1st, H. A. Clark, Crosby, $3; 2d, H. A. Clark, Mountain Rose, $2.
Plums.— Collection of not less than four varieties, other than Japanese:
1st, A. B. Howard & Son, $5.
Single plate of any variety other than Japanese:
1st, F. W. Dahl, Bradshaw, $3; 2d, M. S. Wheeler, Gueii, $2.
Japanese Plums.— Single plate of any variety:
1st, M. S. Wheeler, Chabot, $3; 2d, Parker Bros., Abundance, $2.

John A. Lowell Fund.

Native Grapes.— Any White grape, six bunches:
1st, John Bauernfeind, Niagara, $3.
Any Purple Grape, six bunches:
1st, John Bauernfeind, Worden, $3.
Any Red Grape, six bunches:
1st, John Bauernfeind, Delaware, $3.
Collection of five varieties, three bunches of each:
1st, John Bauernfeind, $5; 2d, E. R. Farrar, $4.

Society's Prizes.

Collection of seasonable fruit, arranged for effect with foliage, to cover a space not larger than 24 sq. ft.:
1st, H. A. Clark, $15; 2d, F. W. Dahl, $12.

Gratuities:

Mrs. R. Goodnough, basket of Pears, $1.
Jennison's Floral Gardens, Ideal Everbearing Strawberry, Vote of Thanks.

October Fruit and Vegetable Exhibition.

October 7 and 8.

Apples.— Collection of not less than six varieties of Fall Apples, ripe, twelve of each:
1st, Elliott & H. W. Moore, $12; 2d, Parker Bros., $10.
Belleflower:
1st, C. S. Smith, $3; 2d, E. R. Farrar, $2.
Fall Pippin:
2d, Elliott & H. W. Moore, $2.
Fameuse:
1st, G. V. Fletcher, $3; 2d, Elliott & H. W. Moore, $2.
Gravenstein:
1st, C. S. Smith, $3; 2d, A. W. Fletcher, $2.
King:
1st, A. W. Fletcher, $3; 2d, M. J. Cain, $2.
Maiden Blush:
1st, Faulkner Farm, $3; 2d, T. L. Perkins, $2.
McIntosh:
1st, M. S. Wheeler, $3; 2d, Mrs. Timothy McDermott, $2.
Palmer Greening:
1st, E. R. Farrar, $3.
Pound Sweet:
1st, G. V. Fletcher, $3; 2d, C. T. Billings, $2.
Rhode Island Greening:
1st, D. R. Craig, $3; 2d, M. S. Wheeler, $2.
Twenty Ounce:
1st, H. A. Clark, $3.
Any other variety, ripe:
1st, C. S. Smith, Porter, $3; 2d, H. A. Clark, Wealthy, $2.

John S. Farlow Newton Horticultural Society Fund.

Pears.— Angouleme:
1st, F. W. Dahl, $3; 2d, Mrs. Elbridge Torrey, $2.
Anjou:
1st, F. W. Dahl, $3; 2d, A. F. Estabrook, $2.
Belle Lucrative:
1st, F. W. Dahl, $3; 2d, E. B. Wilder, $2.
Bosc:
1st, W. G. Kendall, $3; 2d, W. Heustis & Son, $2.
Clairgeau:
1st, F. W. Dahl, $3; 2d, W. Heustis & Son, $2.

Comice:
2d, Elliott & H. W. Moore, $2.
Dana Hovey:
1st, W. G. Kendall, $3; 2d, W. Heustis & Son, $2.
Hardy:
1st, F. W. Dahl, $3.
Louise Bonne de Jersey:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Marie Louise:
1st, Mrs. Elbridge Torrey, $3.
Onondaga:
1st, H. A. Lamb, $3.
Seckel:
1st, W. G. Kendall, $3; 2d, A. F. Estabrook, $2.
Sheldon:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Superfin:
1st, H. A. Clark, $3.
Urbaniste:
1st, F. W. Dahl, $3; 2d, E. B. Wilder, $2.
Any other variety:
1st, E. B. Wilder, Harris, $3; 2d, M. J. Cain, Souvenir du Congrès, $2.
Collection of pears, not more than twelve plates of twelve specimens each, and not less than six varieties:
1st, F. W. Dahl, $10; 2d, E. B. Wilder, $8.

Society's Prizes.

Native Grapes.— Agawam:
1st, John Bauernfeind, $3; 2d, W. G. Kendall, $2.
Brighton:
1st, John Bauernfeind, $3; 2d, W. G. Kendall, $2.
Campbell's Early:
1st, John Bauernfeind, $3; 2d, E. A. Adams, $2.
Concord:
1st, John Bauernfeind, $3; 2d, E. A. Adams, $2.
Delaware:
1st, John Bauernfeind, $3; 2d, W. G. Kendall, $2.
Herbert:
1st, John Bauernfeind, $3; 2, C. W. Libby, $2.
Isabella:
1st, C. W. Libby, $3; 2d, W. G. Kendall, $2.
Lindley:
1st, Samuel McMullen, $3; 2d, C. W. Libby, $2.

Moore's Diamond:
1st, John Bauernfeind, $3; 2d, C. W. Libby, $2.
Niagara:
1st, John Bauernfeind, $3; 2d, Mrs. Timothy McDermott, $2.
Prentiss:
1st, E. S. Martin, $3.
Salem:
1st, John Bauernfeind, $3; 2d, W. G. Kendall, $2.
Vergennes:
1st, John Bauernfeind, $3; 2d, E. S. Martin, $2.
Wilder:
1st, John Bauernfeind, $3; 2d, A. E. Adams, $2.
Worden:
1st, John Bauernfeind, $3; 2d, W. G. Kendall, $2.
Any other variety:
1st, C. W. Libby, McPike, $3; 2d, John Bauernfeind, Diana, $2.
Collection of hardy native grapes, not less than six varieties of three bunches each:
1st, John Bauernfeind, $10; 2d, C. W. Libby, $8.

PEACHES.— Champion:
1st, G. V. Fletcher, $3.
Any other variety:
1st, G. V. Fletcher, Elberta, $3; 2d, H. A. Clark, Elberta, $2.

PLUMS.— Any variety:
1st, M. S. Wheeler, Gueii, $3.

QUINCES.— Any variety:
1st, G. V. Fletcher, Orange, $3; 2d, D. R. Craig, Orange, $2.

BEST FRUITED BRANCH OF BALDWIN APPLES, not over 4 ft. long:
1st, M. S. Wheeler, $5; 2d, D. R. Craig, $3.
Best fruited branch of any other variety:
1st, D. R. Craig, Hubbardston, $5; 2d, Parker Bros., Ben Davis, $3.

BEST FRUITED BRANCH OF PEAR:
1st, D. R. Craig, $5; 2d, W. Heustis & Son, Dana Hovey, $3.

Gratuities:

G. V. Fletcher, collection of Peaches $3.
M. S. Wheeler, 2 twigs of Plums, $1.
Faulkner Farm, Hyslop Crabapples, $1.
T. T. Watt, Papaw, $1.
" " " Chinese Yam, $1.
Mrs. Ivan Panin, English Walnuts, $1.

Autumn Exhibition of Fruits and Vegetables.

November 1, 2, 3, 4, and 5.

Samuel Appleton Fund.

Apples.— Baldwin:
1st, A. B. Howard & Son, $3; 2d, S. A. Schwartz, $2.
Hubbardston:
1st, A. B. Howard & Son, $3; 2d, J. M. Schwartz, $2.

Benjamin V. French Fund, No. 1.

Apples.— R. I. Greening:
1st, Derby Farm, $3; 2d, D. R. Craig, $2.

Benjamin H. Pierce Fund.

For new seedling apple of merit:
M. J. Cain, seedling of Gravenstein, $10.

Society's Prizes.

Apples.— Bellflower:
1st, C. S. Smith, $3; 2d, W. H. Stone, $2.
Delicious:
1st, Derby Farm, $3.
McIntosh:
1st, Derby Farm, $3; 2d, A. B. Howard & Son, $2.
Northern Spy:
1st, E. R. Farrar, $3; 2d, H. A. Clark, $2.
Palmer Greening:
1st, H. C. Fuller Estate, $3; 2d, E. F. Adams, $2.
Pound Sweet:
1st, G V. Fletcher, $3; 2d, A. H. Prouty, $2.
Roxbury Russet:
1st, M S. Wheeler, $3; 2d, H. C. Fuller Estate, $2.
Sutton:
1st, A. B. Howard & Son, $3; 2d, G. V. Fletcher, $2.
Tolman Sweet:
1st, E. R. Farrar, $3; 2d, W. H. Atkins, $2.
Tompkins County King:
1st, M. J. Cain, $3; 2d, E. E. Cole, $2.

Winter Banana:
1st, E. F. Adams, $3; 2d, E. C. Witt, $2.
York Imperial:
1st, M. S. Wheeler, $3; 2d, M. J. Cain, $2.
Any other variety:
1st, Derby Farm, Pearmain, $3; 2d, A. B. Howard & Son, Bailey's Sweet, $2.
For the best collection of winter apples, not less than six varieties, twelve specimens of each:
1st, Derby Farm, $12; 2d, A. B. Howard & Son, $10.
Collection of apples arranged for decorative effect:
1st, A. B. Howard & Son, $20; 2d, E. M. Bruce, $15.
For the largest and best exhibit of apples, not less than ten varieties, five specimens of each:
1st, A. B. Howard & Son, $15; 2d, Derby Farm, $12.
For the best exhibit of apples in trays, not less than five trays and one or more varieties:
1st, A. B. Howard & Son, $25; 2d, Derby Farm, $15.
Crabapples.— Twenty-four specimens, any variety:
1st, E. & H. W. Moore, $3; 2d, Faulkner Farm, $2.
Quinces.— Any variety, twelve specimens:
1st, D. M. Rogers, $3; 2d, A. B. Howard & Son, $2.
Cranberries.— Collection of not less than three varieties, half-peck of each:
L. J. Fosdick, $10.
Half-peck of any variety:
L. J. Fosdick, McFarlin, $5.
Collection of native and foreign fruit, arranged for effect:
1st, Mrs. R. Goodnough, $15; 2d, F. W. Dahl, $12.
Native Nuts.— Collection of not less than four varieties, one quart of each:
1st, Mrs. F. Schultz, $4; 2d, Sarah A. Wheeler, $3.

Marshall P. Wilder Fund.

Native Grapes.— Collection of hardy native grapes, not less than three varieties, three bunches of each:
1st, John Bauernfeind, $10; 2d, C. W. Libby, $8.

John S. Farlow Newton Horticultural Society Fund.

Pears.— Angouleme:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Anjou:
1st, M. J. Cain, $3; 2d, F. W. Dahl, $2.
Bosc:
1st, W. G. Kendall, $3; 2d, W. Heustis & Son, $2.

Dana Hovey:
1st, W. G. Kendall, $3; 2d, W. Heustis & Son, $2.
Langlier:
1st, E. B. Wilder, $3.
Lawrence:
1st, F. W. Dahl, $3; 2d, Derby Farm, $2.
Sheldon:
1st, F. W. Dahl, $3; 2d, G. V. Fletcher, $2.
Vicar:
1st, E. B. Wilder, $3; 2d, F. W. Dahl, $2.
Winter Nelis:
1st, F. W. Dahl, $3; 2d, A. B. Howard & Son, $2.
Any other variety:
1st, W. G. Kendall, Seckel, $3; 2d, W. Heustis & Son, Clairgeau, $2.
Collection of six varieties of winter pears, twelve specimens of each:
1st, F. W. Dahl, $10; 2d, N. T. Kidder, $8.

Theodore Lyman Fund, No. 2.

Plums.— Any variety:
1st, M. S. Wheeler, Prune, $3; 2d, M. S. Wheeler, $1.

Gratuities:

Derby Farm, apples arranged for decorative effect, $10.
M. S. Wheeler, collection of winter apples, $6.
Parker Bros., " " " " $5.
C. A. Stone, Black Alicante Grape, $4.
W. G. Kendall, collection of grapes, $4.
W. C. Winter, collection of hothouse grapes, $3.
J. S. Bailey, hothouse grapes, $3.
J. A. Mason, Superb Everbearing Strawberry, Vote of Thanks.

A Corner of the T. J. Grey Co.'s Exhibit, November 1, 1916

REPORT OF THE COMMITTEE ON VEGETABLES FOR THE YEAR 1916.

By John L. Smith, Chairman.

The Committee on Vegetables is pleased to report that on the whole the year has been a very gratifying one. Climatic conditions during the early part of the season to be sure were unsettled, but, nevertheless, the exhibits indicated that these had been largely overcome by the exhibitors.

The Silver Medal for the best new vegetable introduced in 1916 was awarded to Dr. Frederick S. DeLue for a new yellow sweet corn named "Early Golden Giant." Dr. DeLue's record of it is as follows: Hybrid corn obtained by crossing Golden Bantam with Howling Mob eleven years ago and with continuous selecting since then, resulting in uniformity of color, sweetness, size and greater proportion of grain to the cob.

The exhibit of the T. J. Grey Company of Boston was one of the best we thought ever exhibited in the hall. It consisted of 44 different kinds and 196 varieties.

At times, your Committee was impressed with the feeling that there was a lack of interest on the part of many members of the Society in the exhibitions that are held. In this connection, it is well to bear in mind that the future success of the Massachusetts Horticultural Society depends upon something else besides financial support. While liberal donations should be appreciated and strong financial support is necessary for the success of a Society like ours, nevertheless, we should bear in mind that enthusiastic interest on the part of members is likewise essential.

Your Committee feels, too, that something should be done to stimulate interest on the part of less wealthy persons. The primary purpose of our Society is to encourage an interest in horticulture, feeling that in so doing, we are not only benefiting ourselves but the community as well. Your Committee has not given sufficient

thought to this situation to make any mature recommendation, but we feel that more liberality upon the part of judges, and an increase in the number of prizes, would result in the stimulation of interest among persons who now manifest no concern in the work that we are promoting. If our Society is to be an exclusive one, the number of our exhibits will become less each year, and we are afraid that these will be confined to the more expensive classes of vegetation. This is a condition that should be anticipated, and we feel that if persons of limited financial resources become interested in work of this nature, our exhibits will be more varied, and the acquisition of this new element will add strength to our organization. Bear in mind that this is merely a suggestion, made without giving the situation much thought.

It has been suggested that in the year 1918 the production of vegetables be emphasized. Your Committee is fully in accord with this, and feels that it is not too early to plan for this event. It will require extensive preparations, and intelligent and enthusiastic coöperation on the part of the members, and from the past history of this Society, a very satisfactory year in this respect can safely be predicted.

John L. Smith
Henry M. Howard
Wm. C. Rust
} *Committee on Vegetables.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1916.

William J. Walker Fund.

Beans.— String, fifty pods:
1st, W. J. Clemson, Black Valentine, $4.
Cucumbers.— Four:
1st, J. W. Stone, Long Green, $4; 2d, J. W. Stone, White Spine, $2.
Lettuce.— Four heads:
1st, M. E. Moore, Hittinger, $4; 2d, Hittinger Fruit Co., May King, $2.
Mushrooms.— Twelve specimens:
1st, F. W. Dahl, $4.
Radishes.— Four bunches:
1st, H. M. Howard, Scarlet Globe, $4; 2d J. W. Stone, Scarlet Globe, $2.
Rhubarb.— Twelve stalks:
1st, D. R. Craig, $4.

Gratuity:

W. J. Clemson, New Zealand Spinach, $1.

May Exhibition.

May 10, 11, 12, 13, and 14.

Benjamin V. French Fund, No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Oliver Ames, $4.
Beans.— String variety, forced, one quart:
1st, N. T. Kidder, $4; 2d, W. J. Clemson, $2.
Cucumbers.— Four:
1st, J. W. Stone, $4; 2d, M. E. Moore, $2.
Lettuce.— Four heads of Tennisball:
1st, M. E. Moore, $4; 2d, W. J. Clemson, $2.
Any other variety:
1st, Faulkner Farm, Big Boston, $4; 2d, Oliver Ames, Big Boston, $2.
Radishes.— Four bunches:
1st, J. W. Stone, Scarlet Globe, $4; 2d, Oliver Ames, Crimson Globe, $2.

Rhubarb.— Twelve stalks:
1st, F. W. Dahl, $4; 2d, Oliver Ames, $2.
Spinach.— Two pecks:
1st, Charles Esty, Round Thick Leaf, $4.
Tomatoes.— Twelve specimens:
1st, J. W. Stone, Comet, $4; 2d, N. T. Kidder, Winter Beauty, $2.

Gratuities:

N. T. Kidder, Cauliflower, $2.
W. J. Clemson, " $1.
" " " collection of vegetables, $10.

May 27.

Gratuity:

Oliver Ames, collection of vegetables, $5.

June 17 and 18.

Gratuity:

Oliver Ames, collection of vegetables, $10.

Rose and Strawberry Exhibition.

July 1 and 2.

Beans.— String:
1st, W. J. Clemson, Black Valentine, $4.
Beets.— Twelve, open culture:
1st, W. J. Clemson, Crosby's Egyptian, $4; 2d, D. L. Fiske, Crosby's Egyptian, $3.
Cabbages.— Four specimens:
1st, W. Heustis & Son, Copenhagen, $4; 2d, W. Heustis & Son, Early Market, $3.
Cauliflower.— Four specimens:
1st, D. L. Fiske, White Queen, $6; 2d, Miss Elizabeth Thatcher, Snowball, $3.
Cucumbers.— Four specimens:
1st, J. W. Stone, White Spine, $4; 2d, Miss Elizabeth Thatcher, Telegraph, $3.
Lettuce.— Four heads:
1st, W. J. Clemson, $4; 2d, W. Heustis & Son, $3.
Peas.— Gradus or Thomas Laxton:
1st, E. L. Lewis, $4; 2d, Mrs. S. F. Gill, $3.

Sutton's Excelsior:
1st, E. L. Lewis, $4; 2, Mrs. S. F. Gill, $3.
Any other variety:
1st, E. L. Lewis, Little Marvel, $4; 2d, Mrs. S. F. Gill, Laxtonian, $3.
Collection of four varieties, fifty pods each:
1st, Mrs. S. F. Gill, $5.
Collection of Vegetables.— Ten varieties, tastefully arranged:
1st, W. J. Clemson, $15.

Gratuities:

Miss Elizabeth Thatcher, Mushrooms, $1.
E. L. Lewis, Carrots, $1.
W. Heustis & Son, collection of vegetables, $5.

July 15.

Gratuity:

Oliver Ames, Lister's Prolific Tomato, $1.

Gladiolus Exhibition.

August 11, 12, and 13.

Beans.— String, four quarts:
1st, Oliver Ames, $4; 2d, Miss Elizabeth Thatcher, $2.
Shelled, not Lima, two quarts:
1st, E. L. Lewis, $4.
Cucumbers.— White Spine variety, four specimens:
1st, J. W. Stone, $4; 2d, D. L. Fiske, $2.
Egg Plant.— Four specimens:
1st, W. J. Clemson, $4.
Onions.— Twelve specimens:
1st, Oliver Ames, $4; 2d, D. L. Fiske, $2.
Peppers.— Twelve specimens, any variety:
1st, D. L. Fiske, $4; 2d, Oliver Ames, $2.
Sweet Corn.— Twelve ears, Crosby:
1st, J. W. Stone, $4; 2d, E. L. Lewis, $2.
Twelve ears, any other variety:
1st, E. L. Lewis, Pocahontas, $4; 2d, D. L. Fiske, Quincy Market, $2.
Collection of Vegetables.— Fifteen varieties:
1st, W. J. Clemson, $20; 2d, A. J. Jenkins, $15.
Eight varieties:
1st, E. L. Lewis, $10; 2d, D. L. Fiske, $5.

September 9 and 10.

T. T. Watt, display of Tomatoes, Honorable Mention.
W. Heustis & Son, Celery, Vote of Thanks.
Louis Graton, Irish Cobbler Potatoes, Vote of Thanks.

October Fruit and Vegetable Exhibition.

October 7 and 8.

Beans.— Lima, any variety, four quarts, pods:
1st, Oliver Ames, Burpee's Bush, $4; 2d, D. L. Fiske, Burpee's Bush, $2.
Lima, any variety, shelled, one quart:
1st, M. Cahalan, $4; 2d, D. L. Fiske, $2.
String, four quarts:
1st, Oliver Ames, Valentine, $4; 2d, Miss Elizabeth Thatcher, Farquhar's Plentiful, $2.
Wax, four quarts:
1st, D. R. Craig, Golden Wax, $4; 2d, D. L. Fiske, Golden Wax, $2.
Cauliflower.— Three heads:
1st, Frederic Cole, Snowball, $4; 2d, E. & H. W. Moore, Snowball, $3.
Chard.— Three plants:
1st, E. L. Lewis, Lucullus, $3; 2d, Oliver Ames, Lucullus, $2.
Sweet Corn.— Twelve ears, any variety:
1st, E. L. Lewis, Stowell's Evergreen, $3; 2d, Mrs. Timothy McDermott, $2.
Cucumbers.— White Spine type, four specimens:
1st, J. W. Stone, $3; 2d, Mrs. Timothy McDermott, $2.
Egg Plants.— Four specimens:
1st, Oliver Ames, Black Beauty, $3; 2d, Oliver Ames, New York Improved, $2.
Lettuce.— Cos or Romaine, six heads:
1st, D. R. Craig, $3; 2d, James Donald, $2.
Any other variety:
1st, E. L. Lewis, Big Boston, $3; 2d, Hillcrest Farm, Big Boston, $2.
Peppers.— Twelve specimens:
1st, E. L. Lewis, Chinese Giant, $3; 2d, Oliver Ames, Chinese Giant, $2.
Tomatoes.— Open culture, scarlet, twelve specimens:
1st, Oliver Ames, Chalk's Jewell, $3; 2d, E. L. Lewis, Stone, $2.
Culinary Herbs.— Green, fresh, largest and best collection:
1st, J. A. Nixon, $5; 2d, Mrs. F. C. Upham, $3.

Gratuities:

R. E. Walsh, specimen Pumpkin, $5.
E. B. Dane, Ailsa Craig Onions, $3.
W. Heustis & Son, Celery, $3.
Faulkner Farm, Mushrooms, $3.
Miss Elizabeth Thatcher, Mushrooms, $1.
R. E. Walsh, collection of vegetables, $3.
Dr. F. S. DeLue, new variety of Sweet Corn: Golden Giant, Silver Medal.

Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables.

November 1, 2, 3, 4, and 5.

Beets.— Any round variety, twelve:
1st, E. L. Lewis, $3; 2d, C. F. Jenkins, $2.
Any round variety, six (For cottagers only):
1st, Michael Cahalan, Edmands, $4; 2d, Michael Cahalan, Early Model, $3.
Chard, three plants:
1st, Faulkner Farm, $4; 2d, W. J. Clemson, $3.
Brussels Sprouts.— Four quarts:
1st, E. L. Lewis, $4; 2d, Oliver Ames, $3.
Cabbages.— Any ball-head variety, green, four specimens:
1st, Mrs. J. L. Gardner, $4; 2d, E. L. Lewis, $3.
Savoy, four heads:
1st, E. & H. W. Moore, $4; 2d, Oliver Ames, $3.
Any green variety (For cottagers only):
1st, J. D. Tilton, $4; 2d, J. D. Tilton, $3.
Carrots.— Any variety, twelve specimens:
1st, E. & H. W. Moore, $4; 2d, Oliver Ames, $3.
Cauliflowers.— Three heads:
1st, Frederic Cole, $4; 2d, C. F. Jenkins, $3.
Celery.— Any variety, four heads:
1st, Michael Cahalan, Paris Golden, $5; 2d, E. Jenkins, Paris Golden, $3.
Cucumbers.— White Spine type, four:
1st, J. W. Stone, $3.
Egg Plants.— Four specimens:
1st, Oliver Ames, $3.
Lettuce.— Cos or Romaine, six specimens:
1st, D. R. Craig, $3; 2d, James Donald, $2.

Mushrooms.— Twelve specimens:
1st, A. W. Crockford, $3; 2d, E. B. Dane, $2.
Onions.— Any variety, twelve:
1st, E. B. Dane, Ailsa Craig, $5; 2d, Mrs. Lester Leland, Ailsa Craig, $3.
Parsnips.— Twelve:
1st, W. Heustis & Son, $4; 2d, D. R. Craig, $3.
Peppers.— Twelve:
1st, E. L. Lewis, Chinese Giant, $4; 2d, E. L. Lewis, Squash, $3.
Pumpkin or Squash.— Heaviest specimen:
J. A. Thayer, $5.
Sugar or Winter Luxury, four:
1st, Faulkner Farm, $5; 2d, E. & H. W. Moore, $3.
Collection, two specimens of each variety:
1st, E. L. Lewis, $10; 2d, Oliver Ames, $5.
Tomatoes.— Any indoor scarlet variety, twelve:
1st, A. W. Crockford, $3; 2d, J. W. Stone, $2.
Turnips.— Collection, six specimens, not less than three varieties:
1st, M. S. Wheeler, $5; 2d, J. A. Thayer, $3.
Salad Plants.— Best collection:
1st, D. R. Craig, $6; 2d, J. A. Nixon, $4.
Collection of Vegetables.— Fifteen varieties, not more than one variety of a kind:
1st, E. Jenkins, $75; 2d, Oliver Ames, $50.
Eight varieties, not more than one variety of a kind:
1st, E. L. Lewis, $30; 2d, W. J. Clemson, $15.
Six kinds, distinct species (For cottagers only):
1st, Michael Cahalan, $12; 2d, F. W. Dahl, $6.

Levi Whitcomb Fund.

Potato.— Best seedling variety, not in commerce, grown for at least two years in New England, twenty-four specimens:
E. & H. W. Moore, Dibble's Russet, $20.

Society's Prizes.

For the best display of vegetables put up in glass jars:
1st, Hermine Schulz, $12.

Gratuities:

Faulkner Farm, decoration of kale and parsley, $5.
T. J. Grey Co., display of vegetables, $100.
E. L. Lewis, " " " $3.

REPORT OF THE COMMITTEE ON GARDENS FOR THE YEAR 1916.

By the Secretary.

Two visits only have been made by the Committee on Gardens during the year 1916. The curtailment of the Schedule of Prizes may have been the cause for the diminution of interest in this department of the Society's work. This committee was established early in the Society's history and has exerted a widespread and important influence in promoting the objects for which it was established. A revival of interest is expected during the coming year when the Schedule is to be rearranged and some of the old-time features which have proved so successful in the past are restored.

E. K. Butler's Estate at Jamaica Plain.

On June 5 the committee was invited to visit the estate of Mr. E. K. Butler at Jamaica Plain. This is a suburban estate of one and one-half acres liberally and tastefully planted with a great variety of ornamental trees and shrubs. Many fine specimens of coniferous and deciduous trees are included in the grounds or around the borders and on the day of the visit the rhododendrons and azaleas were in brilliant bloom.

A feature of the estate and one in which Mr. Butler is especially interested is his rose garden which, while not in flower at the time of the visit, gave evidence of what it would develop a few weeks later. The collection of other flowering plants as also the vegetable garden showed an economic utilization of the grounds.

The estate was awarded the Special Prize of $50.00 for an estate in Massachusetts of not more than three acres nor less than one acre that shows the best arrangement in planting and that is kept in the best order.

Walter Hunnewell's Estate at Wellesley.

On July 7 the committee had the privilege of inspecting the Hunnewell estate at Wellesley. Frequently described in detail in the annals of the committee during the past 60 years it is hardly necessary to repeat in this report what has been already written concerning this notable estate, one of the best known private places in the country.

It is now in the fullness of its greatest beauty and the magnificent specimens of trees and shrubs, many of them of rare varieties, make this estate of more than ordinary interest. Owing to the favorable season the foliage never looked better and the whole place showed the result of continued care and improvement. The Society's Gold Medal was awarded Mr. Hunnewell in recognition of his interest in maintaining the high standard of excellence of his estate.

R. M. Saltonstall, *Chairman*
David R. Craig
Jackson T. Dawson
William Nicholson
Charles Sander
} *Committee on Gardens.*

REPORT OF THE COMMITTEE ON CHILDREN'S GARDENS.

By Henry Saxton Adams, Chairman.

The annual exhibition of the products of children's gardens was held at Horticultural Hall on Saturday and Sunday, September 2nd and 3rd. The appropriations for prizes were the same as the previous year, namely, $300.00, of which amount $200.00 was given by the State for the encouragement of agriculture among the children.

It has been interesting to watch the growth and development of the interest of children in gardening as shown in our exhibitions. The 1916 exhibition was the most successful ever held by the Society. Not only were there more exhibits but the quality has steadily improved until it now requires expert judging to properly award the prizes and your committee feels embarrassed at times in attempting it.

Most of our exhibits come from three types of gardens — city, suburban, and country. We have those who grow flowers and vegetables under the most trying conditions in the heart of the city and it is always surprising to see what success they have. These little gardeners we feel are deserving of great credit and encouragement. The other two classes represent products brought from suburban or country gardens, grown under favorable conditions and in many cases expert advice, and resulting in exhibits which have been grown and selected to compete with the best flowers and vegetables to be found in any show in the country. Truly our exhibitions are well worth continuing and are bringing forth wonderful results.

In comparing this exhibition with previous ones it is interesting to note that in 1912 there were 108 prizes as against 210 in 1916; the growth being so great as to make it difficult for your committee to make the awards in the limited time at its disposal. A word of appreciation should here be given to Mr. James Wheeler whose

work in arranging the exhibits is not easy and for his patience with the children and with the garden directors who swarm the exhibition hall all wanting his attention at the same time.

The exhibits from school gardens were excellent and an improvement in both quality and arrangement over other years was noted. The flowers from both school and home gardens were universally good and some large collections were shown. Perhaps the two classes of exhibits which attracted the most attention were the canned vegetables and the exhibits of wild flowers, berries, leaves, and grasses. One entry of canned vegetables by an individual exhibitor contained 28 bottles with 27 varieties, both growing and preserving the work of Miss Hermine Schulz of Roslindale. The Huntington School District, Brockton, sent in 134 bottles from 16 exhibitors of which one collection contained 28 jars. The Brockton High School Canning Club also presented a very creditable collection of 70 bottles. It was interesting to note the general interest taken in the collections of wild flowers of which we had 4 entries, the largest containing 172 vases.

The vegetables as before noted were better in every way than at any previous exhibit. In some of the classes we had large numbers of entries; of Beets there were 52 single entries, of String Beans 48, of Carrots 32, of Tomatoes 34, and so on with a total number of more than 250 single entries among the various varieties of vegetables for which prizes were offered.

Our appropriation was used up and many worthy exhibits could not be given awards. We look upon the exhibition of 1916 as most satisfactory proof of the value of this work with the children and believe that the members of the Society should be proud of the work we are doing. We ask for larger funds and encouragement from the Society and hope the members will make an effort to attend the exhibition in 1917 which bids fair to be even better than that of 1916.

A list of the important awards follows:

For the best collection of vegetables from a school garden:

First.— Waltham North Grammar School	$6 00
Second.— Belcher School Garden, East Milton	5 00
Third.— Mrs. G. H. Blood School Garden, Groton	4 00
Fourth.— Huntington School, Brockton	3 00

For the best collection of vegetables from a school garden established since January 1, 1913:

First.— Copeland School, Brockton	5 00
Second.— McKinley School, Brockton	4 00
Third.— Edward Everett School, Dorchester	3 00
Fourth.— Broadway and Lee St. Garden, Cambridge	2 00

For the best collection of vegetables from a school garden within five miles of the State House:

First.— Young Peoples Garden, Deerfield St., Boston	5 00
Second.— Norfolk House Center Garden, Roxbury	4 00
Third.— Sterling St. Garden, Boston	3 00
Fourth.— Roxbury Charitable Society	2 00
Fifth.— John Winthrop School, Dorchester	1 00

For the best collection of flowers from a school garden:

First.— Waltham North Grammar School	6 00
Second.— Belcher School, East Milton	5 00
Third.— Girls Industrial School, Dorchester	4 00
Fourth.— Winthrop School, Brockton	3 00
Fifth.— Little House Garden, South Boston	2 00

For the best collection of flowers from a school garden established since January 1, 1913:

First.— Belcher School, East Milton	5 00
Second.— Copeland School, Brockton	4 00
Third.— Groton School, Groton	3 00
Fourth.— Edward Everett School, Dorchester	2 00

For the best collection of flowers from a school garden within five miles of the State House:

First.— Young Peoples Garden, Boston	5 00
Second.— Norfolk House Center Garden, Roxbury	4 00
Third.— Roxbury Charitable Society	3 00
Fourth.— Broadway and Lee St. Garden, Cambridge	2 00
Fifth.— John Winthrop School, Dorchester	1 00

For the best collection of vegetables from a child's home garden:

First.— Hermine A. Schulz, Roslindale	5 00
Second.— James Spadea, Brockton	4 00
Third.— Wilson Metcalf, Brockton	3 00
Fourth.— Harold Turner, North Reading	2 00

For the best collection of flowers from a child's home garden:

First.— Margaret Thatcher, Brookline	$5 00
Second.— Gertrude Schulz, Roslindale	4 00
Third.— Ruth F. Merrill, Dorchester	3 00
Fourth.— Wilfrid Tuttle, Arlington	2 00
Fifth.— John Craton, Malden	1 00

For the best collection of flowers from a child's home garden within five miles of the State House:

First.— Gertrude Entner, 112 Myrtle St., Boston	3 00
Second.— Kenneth R. Craig, Brookline	2 00
Third.— Frederick Hoch, Roxbury	1 00
Fourth.— Minnie Webb, Roxbury	1 00

For the best collection of vegetables from a child's garden put up in glass jars by the exhibitor:

First.— Hermine A. Schulz, Roslindale	3 00
Second.— Gust W. Anderson, Brockton	2 00
Third.— Frank Reilly, Brockton	1 00

Henry Saxton Adams
Dr. Harris Kennedy
Mrs. W. Rodman Peabody
Miss Margaret A. Rand
James Wheeler

Committee on Children's Gardens.

REPORT OF THE COMMITTEE ON LECTURES AND PUBLICATIONS FOR THE YEAR 1916.

By Wilfrid Wheeler, Chairman.

It is becoming increasingly difficult each year to find suitable lecturers to fill the course as offered by the Society, and while the interest in all subjects relating to horticulture still continues, the large number of lectures and demonstrations given by local and other organizations interested in horticulture serves to draw many from our lectures.

The question of shortening the course has been discussed by your committee with the idea of securing persons from a distance who might have a message to bring us. Our efforts along this line have so far failed, possibly because of distance, possibly because we are unable to offer large enough financial inducement. Your Chairman feels, however, that these lectures should not be given up, as they constitute one of the direct activities of the Society, and are as important to the society as are the exhibitions.

Many organizations are adopting the policy of having their lecture course go on with their exhibitions and this is proving very successful. Lectures relating to the plants, fruit, flowers, or vegetables exhibited are given and the public have the added inducement to come, in that they see the exhibit and learn about the process of growing the particular thing exhibited. This plan could be carried out, provided an upstairs lecture hall could be equipped in the building.

The course of 1916 consisted of eleven lectures, and an attendance of about two thousand was recorded. Lectures on fruit subjects seem still to draw the largest attendance, with gardens and plant exploring, close seconds.

The course as offered for 1917 is quite varied and some very interesting speakers have been secured. Your Chairman would like to suggest that in advertising the lectures this year that street

car dasher signs be used, as at the exhibitions, making it a prominent feature that the lectures are free.

The lectures of the year have all been published in the annual Transactions of the Society and thereby reach an additional circulation.

Wilfrid Wheeler
John K. M. L. Farquhar
F. C. Sears
Fred A. Wilson
} *Committee. on Lectures.*

REPORT OF THE DELEGATE TO THE STATE BOARD OF AGRICULTURE FOR THE YEAR 1916.

By Edward B. Wilder, Delegate.

As delegate from the Massachusetts Horticultural Society to the Massachusetts State Board of Agriculture I have the honor to submit the following report of the activities of the Board for the year of 1916.

The work of the Board has been increased the past year by the apple grading law, which became effective as a compulsory measure July 1, and the necessity for determining the distribution and prevalence of the white pine blister rust. The work of acquainting growers with the provisions of the apple grading law and regulations, begun in 1915, was continued in 1916, and demonstrations were given by inspectors in twenty-nine towns and cities and by farm bureaus and the Massachusetts Agricultural College packing school. Six deputy field inspectors and a chief deputy were appointed and regular inspection work was begun in September. To November 30 there were made 1,415 inspections of fruit produced or owned by 396 growers and packers.

Of the violations discovered, practically all were cases of incorrect marking. Some of the fruit growers seemed to have the impression that the provisions of the law were unduly strict and were afraid to attempt to grade under it. For this reason more apples were shipped to the Boston market in bushel boxes than ever before, and many growers marked their entire crop ungraded. Closer study will show that this law in its essentials is simple and it is believed that from now on a much larger proportion of fruit will be graded and packed as Massachusetts Standard A.

For the suppression of the white pine blister rust the legislature appropriated $10,000 and the Governor and Council $3,000 with provision for $2,000 more if needed. Altogether nearly $14,000 was expended by the Board for this purpose.

The thirty-eighth consecutive year of institute work has been completed with 161 institutes held. Poultry raising was the most popular subject; fruit topics stood second; while calls for lectures on vegetable growing, dairying, farm management, marketing, and forage crops, and on economic subjects, were frequent.

Bounties paid the thirty-four agricultural and horticultural societies applying aggregated $29,480.08. The appropriation of $2,000 for bounties to poultry associations was apportioned among 14 of the 17 applying, each association receiving about two-thirds of what it had expended in "State first premiums."

Boys' and girls' agricultural clubs were conducted under the following titles: — "Home and School Garden Club," "Market-garden Club," "Potato Club," "Pig Club," "Home Economics Club," "Canning and Marketing Club," "Poultry Club," and "Calf Club." At the National Dairy Show held at Springfield in October there was assembled the greatest exhibit ever held of garden products, live stock, canned goods, and clothing, wholly the product of boys and girls under nineteen years of age. Judging and athletic contests were also held.

The public winter meeting of the Board at Horticultural Hall, Boston, in January, brought out a splendid corn and apple show, as well as an exhibit of boys' and girls' club work. There were also exhibits from the Dairy Bureau, the State Ornithologist, and a milk, cream and butter show conducted by the Massachusetts Dairymen's Association. The exhibition as a whole was far and away the best the Board has so far held in connection with its public winter meeting, and interest was evinced by the large attendance all three days of the exhibition.

A special prize of $25 was offered through the Board by a friend for the best acre of potatoes in the town of Phillipston, and certain other similar prizes were offered in the same way. Some of the money offered at the dairy show at Amherst was provided by the Board, and a very good show resulted. The Board, as last year, offered prizes for a beekeeper's exhibit at the Worcester and Greenfield fairs; and under the direction of Dr. B. N. Gates a very attractive exhibit was gotten together.

The orcharding contest was also conducted as in 1915 by the committee on orcharding and fruit growing, and judged by F. Howard Brown with the following results: —

Class 1. Peaches.

No entries.

Class 2. Pears.

Section 1.— For best orchard of not less than 1 acre: First, Fred Steele, Stoneham, $25; no second prize; third, W. H. Atkins, South Amherst, $10.

Section 2.— For the best crop from a single tree: First, W. A. Root, Easthampton, $10; second, J. Corey & Son, Truro, $5.

Class 3. Apples.

Section 1.— For the best orchard of 1 acre of standard apple trees; trees must have been planted in fall of 1911, spring or fall of 1912 or 1913, or spring of 1914: First, J. H. Hardy, Jr., Littleton, $25; second, R. L. Everit, Barre, $15; third, Patten Brothers, Sterling, $10. (Honorable mention and gratuities of $5 each, John Chandler, Sterling Junction; J. T. Geer, Three Rivers; W. D. Gleason, Sterling Junction; C. A. Wilson, Medway.)

Section 2.— For the best orchard of not less than 3 acres; trees must have been planted in fall of 1911, spring or fall of 1912 or 1913, or spring of 1914: First, O. C. Searle & Son, Easthampton, $25; second, John Chandler, Sterling, $15; third, tie between A. S. Geer, Three Rivers, $5, and J. M. Burt, East Longmeadow, $5. (Honorable mention and gratuity, H. A. Dunbar, Richmond, $5.)

Section 3.— For the best apple orchard in bearing, size of orchard not specified; no trees planted earlier than the fall of 1901 to be eligible: First, Edward F. Belches, Framingham, $25; second, W. H. Atkins, South Amherst, $15; third, Cyrus D. Ordway, West Newbury, $10.

Section 4.— For best old apple orchard renovated: First, O. C. Searle & Son, Southampton, $25; second, Wright A. Root, Easthampton, $15; third, Sumner L. Howe, Marlborough, $10. (Honorable mention and gratuity of $5 each to Naquag Farm, Rutland; Ralph F. Barnes, Marlborough; the Misses Noyes, Methuen.)

Section 5.— For the best yield of marketable apples from a single tree planted in fall of 1901 or later: First, W. A. Root, Easthampton, $10; second, W. H. Atkins, South Amherst, $5.

Section 6.— For best yield of marketable apples from a single tree planted in spring of 1901 or earlier: First, W. H. Atkins, South Amherst, $10; second, O. C. Searle & Son, Southampton, $5.

In the class for renovated orchards Mr. O. C. Searle of Southhampton had a good record with a yield of 1,200 bushels. In the class for best yield from single pear tree, W. A. Root of Easthampton won with a Clapp's Favorite tree yielding 20 bushels.

In the class for best yield of apples from an old tree W. H. Atkins of South Amherst carried off first prize, with a yield of 45½ bushels.

In this connection an extract from the report of the judge may be of interest.

> We found different troubles more prominent in different sections as was to be expected, red-humped caterpillar being much more plenty in the central and western sections, while, of course, the gypsy moths were plenty in the eastern section, on account of the bad weather during spray time. The results of spraying, so far as gypsy moths were concerned, were largely nullified....
>
> In spite of the shortage of labor this year on all the farms we have never seen finer orchards nor some in better condition.

The contests for the encouragement of dairying were continued as in the three years preceding, the Legislature having renewed the appropriation for a similar period. Cash prizes aggregating $2,700 were offered. There were 653 entries and 578 contestants. Cash prizes were also offered to local inspectors of milk and to coöperative creameries.

The small amount allowed by the Legislature for the inspection of apiaries made it difficult to properly cover the State. With the development of large orchards and plantations of small fruits, and the growth of the cucumber industry, more bees are needed and greater protection should be afforded. A disease known as bee paralysis made its appearance. Little is known as to its origin and control but it is said that this disease killed over 80 per cent of the bees in England.

Nursery inspection followed along much the same lines as formerly, although the work was increased to cover the gypsy and brown-tail moth inspection in the smaller nurseries which were not covered by the government inspectors. The increase in the number of nurseries and a larger planting have made more demands upon the inspection force.

The work of the Dairy Bureau was broadened by legislative authority so as to include encouragement of the dairy industry. It has had charge of the clean milk contest, and has held exhibits and issued pamphlets. Fewer prosecutions than usual have been made although the same strict watch has been kept for violations of the dairy laws.

Interest in bird life is increasing year by year, and the character of the work done by the State Ornithologist is being more and more appreciated. The Ornithologist has continued his observations of birds as protectors of crops and of their distribution and habits, and has written several bulletins and circulars.

The Board held its Summer Field Meeting at Great Barrington in June and its annual meeting at Boston in December. Six new members were seated, and two members automatically dropped because their respective societies held no fair. The Massachusetts Federation of County Leagues and Farm Bureaus was represented by a delegate for the first time. At the close of the year there are 41 members of the Board of whom 32 represent as many agricultural and horticultural societies.

REPORT OF THE SECRETARY AND LIBRARIAN FOR THE YEAR 1916.

The Secretary and Librarian presents herewith his fifteenth annual report covering the eighty-sixth year of the Society's history.

The ten exhibitions of the products of the garden, farm, and orchard held during the year have been, on the whole, creditable to the Society and the public interest in them has been well sustained.

Extensive preparations were made for the Spring Flower Show of March 17–19, but the exhibits were somewhat lessened by the unfavorable weather conditions prevailing that week around Boston, the temperature ranging from 10 to 15° above zero.

The season during the first half of the year was cold and backward necessitating the postponement for a week of the scheduled dates of the Peony and the Rose and Strawberry Exhibitions, the latter occurring July 1 which appears to be the latest date on record for this exhibition.

The Sweet Pea and Gladiolus Exhibitions though held on the scheduled dates were a week too early for growers in the vicinity of Boston, but owing to large entries from other parts of the country these proved to be very satisfactory, especially the Gladiolus Exhibition which was made of more than the usual interest by the exhibits of the American Gladiolus Society which held its Seventh Annual Exhibition in connection with the Society's show. An immense collection of this popular flower was staged practically filling the three halls of the building.

The Exhibition of the Products of Children's Gardens held September 2–3 was the largest and best ever held. The interest and enthusiasm of the young gardeners seem to be increasing every year and promise well for the future development of gardening. The committee having this department in charge should receive the Society's most liberal encouragement for it is doing a practical work in advancing the interest in horticulture among the young people.

The Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables held November 1–5, while somewhat below the average in floral displays, was noteworthy for the fruit and vegetable exhibits, which were of unusual excellence and in their artistic arrangement were equal to anything ever before shown in the halls.

The other details of the year's activities will be fully set forth in the reports of the various committees and it would be only a repetition to dwell further upon them in this report.

The publications of the Society for the year have been as follow:

February 24. Schedule of Prizes and Exhibitions for the year 1916, 56 pp.

May 4. Transactions, 1915, Part II, pp. 114–267, and Plates 1–4.

May 16. Preliminary Schedule of Exhibition of March, 1917, 8 pp.

August 23. Transactions, 1916, Part 1, pp. 1–143.

The Library.

The usual flow of horticultural and agricultural accessions has continued through the year, although the receipt of some foreign periodicals has been interrupted on account of the European war. The library seems to be more and more appreciated as is evident from the use made of it by specialists from various sections of the country who find it necessary to consult it in investigating subjects of horticultural interest.

The collection of nurserymen's and seedsmen's trade catalogues has been increased by 534 during the year making the total number of these 9740. This collection is proving of much historical value, especially in determining the origin and date of introduction of many of our popular garden plants, fruits, and vegetables.

And lastly, and perhaps most important, the librarian is pleased to state that the new catalogue is now being printed and a considerable portion of it is already in type.

William P. Rich,
Secretary and Librarian.

REPORT OF THE TREASURER FOR THE YEAR 1916.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current with* WALTER HUNNEWELL, *Treasurer, December 31, 1916.*

DR.

Paid for Library from Appropriation	$272 25
" " " " J. D. W. French Fund	105 54
" " " " J. S. Farlow Fund	62 64
" " Heating	1,105 61
" " Lighting	841 20
" " Labor	2,257 73
" " Stationery and Printing	1,362 93
" " Postage	198 00
" " Insurance	335 85
" " Incidentals	1,130 31
" " Repairs	607 80
" " Committee on Lectures and Publications	463 00
" " Salaries of Officers	4,439 92
" " " Committee on Plants and Flowers	316 00
" " " " " Fruits	141 66
" " " " " Vegetables	136 00
" " " " " Prizes & Exhibitions	271 20
" " Medals	439 63
" " Prizes for Plants and Flowers	5,580 00
" " Prizes for Fruits	1,203 00
" " Prizes for Vegetables	873 00
" " Prizes for Children's Gardens	393 01
" " H. A. Gane Fund	45 00
" " John C. Chaffin Fund	49 00
" " John Lewis Russell Fund	20 00
" " G. R. White Medal of Honor Fund	229 63
Balance December 31, 1916, Treasurer and Bursar	17,032 10
	$39,912 01

Cr.

Balance December 31, 1915			$8,072 41
Received Rents		4,150 98	
" Exhibitions	5,547 25		
" less expenses	1,638 11	3,909 14	
" Membership Fees (389. Income a/c, 275. Perm. Fund)		664 00	
" State Bounty		1,000 00	
" Sundry Donations		188 61	
" Mount Auburn Cemetery (1340.22 Income a/c, 1340.22 Perm. Fund)		2,680 44	12,593 17
" Interest on securities from the following funds:			
S. Appleton		40 00	
J. A. Lowell		40 00	
T. Lyman		440 00	
J Bradlee		40 00	
B. V. French, No. 1		20 00	
H. H. Hunnewell		160 00	
W. J. Walker		94 16	
L. Whitcomb		20 00	
B. B. Davis		20 00	
M. P. Wilder		40 00	
J. L. Russell		40 00	
F. B. Hayes		400 00	
H. A. Gane		40 00	
J. S. Farlow		100 00	
J. D. W. French		200 00	
B. H. Pierce		32 00	
J. C. Chaffin		40 00	
B. V. French, No. 2		120 00	
G. R. White		300 00	
J. S. Farlow, Newton		116 00	
J. A. French		200 00	
			2,502 16
" Interest and dividends on securities other than those for the above funds			10,144 27
" George Robert White Medal of Honor			1,500 00
" Special Fruit Show, 1917			100 00
" Bequest of Miss Helen Collamore			5,000 00
			$39,912 01

Assets.

Real Estate	$518,564 63
Furniture and Exhibition Ware	10,796 96
Library	45,110 47
Plates and History	235 50
$2,000 Kansas City, Clinton, and Springfield Bonds	1,980 00
10,000 Lake Shore and Mich. So. Bonds	10,415 25
21,000 City of Newton Bonds	24,228 75
50,000 Atch. Topeka and S. F. Bonds	44,693 25
50,000 Chicago Burl. and Quincy Bonds	50,012 50
10,000 Chicago and West Mich. Bonds	9,987 50
25,000 K. C. F. S. and Memphis Bonds	27,523 75
50,000 C. B. and Q. Illinois Bonds	51,625 00
8,000 Boston and Maine Bonds	8,710 00
4,000 Am. Tel. & Tel. 4% Bonds, 1936	4,110 00
4,000 United Fruit 5 % Notes, 1918	3,840 00
4,000 Interboro 5 % Bonds, 1966	3,920 00
12,000 Pacific Telephone Bonds	11,670 00
260 shares General Electric Stock	12,909 90
Hayes and Loring, Trustees	2,308 66
Cash in hands of Treasurer and Bursar	17,032 10
	$859,674 22

Liabilities.

Funds invested in Bonds and Stocks:

S. Appleton	Fund	$1,000 00
J. A. Lowell	"	1,000 00
T. Lyman	"	11,000 00
J. Bradlee	"	1,000 00
B. V. French, No. 1	"	500 00
H. H. Hunnewell	"	4,000 00
W. J. Walker	"	2,354 43
L. Whitcomb	"	500 00
B. B. Davis	"	500 00
M. P. Wilder	"	1,000 00
J. L. Russell	"	1,020 00
F. B. Hayes	"	10,000 00
H. A. Gane	"	1,184 00
J. S. Farlow	"	2,540 80
J. D. W. French	"	5,242 97
B. H. Pierce	"	800 00

J. C. Chaffin Fund	$1,250 89	
B. V. French, No. 2 "	3,000 00	
J. A. French "	5,000 00	
G. R. White "	7,673 45	
J. S. Farlow, Newton "	2,900 42	
Library Catalogue "	1,670 00	
Special Fruit Show 1917	100 00	
Unrestricted Funds	5,000 00	$70,236 96
Surplus		789,437 26
		$859,674 22

WALTER HUNNEWELL,
Treasurer.

MEMBERSHIP OF MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1916.

Life Members, December 31, 1915		773	
Added in 1916		9	
Changed from Annual		2	
		784	
Deceased		24	760
Annual Members, December 31, 1915		168	
Added in 1916		8	
		176	
Deceased	1		
Changed to Life	2		
Resigned	2	11	165
Dropped for non payment of dues	6		
Membership, December 31, 1916			925

INCOME FROM MEMBERSHIP.

9 New Life members at $30	$270 00
8 New Annual Members at $10	80 00
2 changed to Life	40 00
Assessments for 1916	274 00
	$664 00

WALTER HUNNEWELL,
Treasurer.

AUDITOR'S CERTIFICATE.

40 State Street, Boston,
March 30, 1917.

To the Finance Committee of the
Massachusetts Horticultural Society.

Gentlemen:

As requested by you I have made a thorough audit of the books and general accounting affairs of the Massachusetts Horticultural Society for the year which ended with the thirty-first day of December, 1916, and herewith submit to you my report of the same.

Report.

I have proved the correctness of the ledger, journal, and cash books and the small books tributary to the cash books, and saw that all balances were properly carried forward. I examined all vouchers and checks representing the disbursements during the year and found the amount of cash required by the cash book upon the first day of January, 1917, to have been on hand, and also examined the securities of the Society, finding them in all details in accordance with the requirements of the records. I traced all postings from the journal and cash books into the ledger and certify that the balance sheet taken from it as of the 31st day of December, 1916, is a correct abstract and that the Treasurer's statement of the assets and liabilities of the Society upon said date is true to the best of my knowledge and belief.

In short, I satisfied myself that the work in connection with the accounting affairs of the Society is being intelligently and faithfully performed and that the books and papers of the Society are in commendable condition.

Yours very respectfully,

Andrew Stewart,
Certified Public Accountant.

THE ANNUAL MEETING, NOVEMBER 18, 1916.

ANNUAL MEETING FOR THE YEAR 1916.

The Annual Meeting of the Massachusetts Horticultural Society for the year 1916 was held at Horticultural Hall, Boston, on Saturday, November 18, at twelve o'clock, noon, with Vice President, Nathaniel T. Kidder, in the chair.

The Secretary announced that the meeting was called in accordance with the requirements of the By-laws of the Society for the purpose of electing a President, a Vice President, four Trustees, and a Nominating Committee for the ensuing year, and for the transaction of such other business as might be legally presented.

The President appointed E. B. Wilder, J. A. Crosby, and W. P. Rich a committee to receive, assort, and count the ballots, and report the number, and declared the polls open, to remain open until three o'clock.

The record of the preceding meeting of the Society was read by the Secretary and duly approved.

Vice President Kidder stated that in compliance with the provisions of Section IX. of the By-laws the Board of Trustees had made an appropriation of $6000.00, in addition to the income of the special prize funds of the Society, for prizes and gratuities for the year 1917 and $350.00 for prizes for children's gardens.

Messrs. Ufford, Barber, Butler, and Farquhar made suggestions for increasing the interest in these meetings as well as in the Society generally which were referred to the Board of Trustees for report next year. Mr. Farquhar also called attention to the proposed Concours of Roses to be held in Paris in 1917 and 1918, notwithstanding the conditions prevailing in France at the present time. It is desired by the management of the Concours to have five plants of each variety of roses to be grown there for examination until the end of October, 1918. It was voted to refer the matter to the Board of Trustees for such action as it may desire to take with the recommendation that Mr. Farquhar be made chairman of the committee.

On motion of Mr. Wilder, seconded by Mr. David R. Craig, the following vote was adopted:

That the matter of prizes and exhibitions be taken up at the Inaugural Meeting for discussion and action.

At three o'clock Vice President Kidder declared the polls closed and Chairman Wilder of the ballot committee reported the result of the voting as follows:

Whole number of ballots cast 25.

For President, Richard M. Saltonstall received 23.

For Vice President, Nathaniel T. Kidder received 25.

For Trustees, Ernest B. Dane, 24; Andrew W. Preston, 23; Edwin S. Webster, 23; Stephen M. Weld, 22.

For Nominating Committee, William Downs received 24; John K. M. L. Farquhar, 24; Nathaniel T. Kidder, 24; Marcellus A. Patten, 23; William Sim, 25.

Vice President Kidder declared the following named persons to be the duly elected officers of the Society for the year 1917:

President	Richard M. Saltonstall
Vice President (for two years)	Nathaniel T. Kidder
Trustees (for three years)	Ernest B. Dane
	Andrew W. Preston
	Edwin S. Webster
	Stephen M. Weld
Nominating Committee	William Downs
	John K. M. L. Farquhar
	Nathaniel T. Kidder
	Marcellus A. Patten
	William Sim

The meeting was then dissolved.

William P. Rich,
Secretary.

NECROLOGY, 1916.

NECROLOGY, 1916.

William Henry Bowker of Boston, a member of the Society since 1878, died January 4, 1916, at the age of 65. Mr. Bowker was well known among the agricultural interests of New England and was a recognized authority on the subject of fertilizers.

Everett W. Raddin of Cliftondale, Massachusetts, died at Danvers, January 7, 1916, in his 64th year. Mr. Raddin was much interested in the objects of the Society of which he became a member in 1891.

Edgar Howard Doane of Wenham, Massachusetts, a member of the Society since 1902, died January 17, 1916, at an advanced age. He was a great lover of flowers and had a natural aptitude and long experience in cultivating them successfully.

Edward Sturgis Grew of Boston, a member of the Society since 1899, died at West Manchester, January 20, 1916, at the age of 73. Mr. Grew in addition to his many business interests in Boston was also actively interested in philanthropic work in his native city and especially in the objects for the advancement of which this Society was established.

Doctor William Palmer Bolles of Roxbury, Massachusetts, a graduate of the Harvard Medical School of the Class of 1871, died at Santa Barbara, California, March 18, 1916. Doctor Bolles, besides his professional work was much interested in natural history studies. He became a member of the Society in 1875.

John Hopewell of Newton, Massachusetts, died in Washington, D. C., March 28, 1916, in his 71st year. He was admitted a member of the Society in 1913.

Miss Cora Huidekoper Clarke who died in Boston, April 2, 1916, was the daughter of the late Rev. James Freeman Clarke. Miss Clarke was born in Meadville, Pennsylvania, February 9, 1851. She was well known in Boston scientific circles for her interest in natural history studies and in horticulture. She had been a member of the Society since 1871.

Mrs. Henry S. Russell of Milton, Massachusetts, died April 2, 1916. She became a member of the Society in 1914.

Charles W. Ross of Newton, Massachusetts, a member of the Society since 1879, died at his home in that city April 11, 1916, at the age of 67. Mr. Ross, for twenty-five years, was the street Commissioner of Newton.

Albert H. Roffe of Newton, Massachusetts, a member of the Society since 1903, died June 3, 1916.

William G. Peck of Arlington, Massachusetts, died in that town June 16, 1916, at the age of 75 years. He had been a member of the Society since 1871.

N. Allen Lindsey of Marblehead, Massachusetts, died in that town July 1, 1916. He joined the Society in 1904.

George Edward Morris of Waltham, Massachusetts, a member of the Society since 1912, died in that city July 5, 1916, at the age of 63 years. Mr. Morris was interested in natural history researches, especially in mycology, in which he was an authority, and he made a large collection of drawings of fungi and native plants.

Eben Dyer Jordan, one of the best known merchants of Boston, died at his summer home in West Manchester, Massachusetts, August 1, 1916, in his 59th year. He was a man of a wide range of interests in business, music, art, and horticulture. He became a member of the Society in 1899.

JACKSON THORNTON DAWSON of Jamaica Plain, Massachusetts, died at his home there August 3, 1916, in the 75th year of his age. He became a member of the Society in 1872 and throughout the remainder of his life was actively interested in its work. He served as a member of several committees and contributed valuable papers on horticultural subjects which have been published in the Transactions of the Society. In recognition of his ability as a plantsman he was awarded in 1910 the George Robert White Medal of Honor for eminent service in horticulture.

The following tribute to his memory by Mr. Augustus P. Calder of Brookline was presented at the October, 1916, meeting of the Gardeners' and Florists' Club of Boston and is here printed by request. It gives an insight into the character of the man and the regard in which he was held by his associates.

IN MEMORY OF JACKSON THORNTON DAWSON.

During the last summer vacation of our club the unbidden messenger came among us. Again we are called upon to mourn the loss of a dearly beloved member, Jackson Thornton Dawson.

He had been lying upon a bed of sickness but a few days, when, on August 3d last, in the ever changing twilight of a delightful summer afternoon, when all the things of earth, the fields, the woods, the trees, the shrubs and flowers, those heavenly creations that he loved so well, that had been his beloved companions in life, through which in Nature he looked up to Nature's God, were radiant and beautiful, clothed as they were in the royal vestments of Heaven's own exquisite encompassings, he gently fell asleep and his helpful, loving hands were folded forever. Earth that had nourished him and claimed his growth to be restored to earth again and his spirit returned unto God who gave it.

In writing of Jackson Dawson your committee has been confronted by the fact that the plainest and most truthful statements concerning his character and worth would seem to those who did not know him like fulsome flattery. While we would not in these memorial lines transcend the limits of sobriety of thought and expression it yet is difficult to avoid the language of eulogy in voicing truthfully the plain facts of a life that has so commanded the admiration of us all.

Simple justice alone to his memory, justice to the noble profession of which he was so bright and conspicuous an ornament, requires that we bear witness to that which we have seen and heard, as his life has been openly lived before our eyes and against which no dissenting voice is raised.

Mr. Dawson was born in East Riding, Yorkshire, England, in 1841. He came with his mother to this country as a child eight years of age. He started in gardening in the nurseries of his uncle at Andover, Massachusetts. After a few years he went to the Hoveys in Cambridge whose nurseries were then the only great establishment of the kind in the country.

His enlistment in the Civil War interrupted his horticultural studies until his discharge in 1864, after which he again resumed work at Hoveys where he gained much valuable experience which fitted him for higher duties and greater responsibilities. The opportunity soon presented itself and Mr. Dawson accepted a position under Francis Parkman of the School of Horticulture at the Bussey Institution in Jamaica Plain and soon afterward became identified with Professor Charles S. Sargent in the planting and development of the Arnold Arboretum. Many of the trees which are growing there today on its broad acres were reared by him from the seeds and there are oaks which now rise fifty feet high from the acorns he planted.

Mr. Dawson was regarded by horticulturists as one of the world's greatest gardeners and in 1910 was awarded a Medal of Honor by the Massachusetts Horticultural Society, of which he was a member, for having contributed more than any one else to the advancement of horticulture during that year. He was also a member of the Society of American Florists and the Gardeners' and Florists' Club of Boston of which he was president in 1893 and at the time of his death an honorary member.

On December 1st, 1866, Mr. Dawson married Mary McKenna who passed on several years ago. Eight children were born of this union, six of whom survive him. Mr. Dawson was a bright and shining light in the firmament of the horticultural world. In his home life he exemplified the virtues which adorn the faithful loving husband, the affectionate father, and the patriotic citizen. He radiated the brightness of a cheerful disposition and his genial

manner and openhearted way endeared him to all who were privileged to be associated with him. "None knew him but to love him, none named him but to praise."

Fellow members of the Gardeners' and Florists' Club as we face and draw nigh to the summer twilight of our lives, as we brush the dead leaves from our homeward path with the consciousness that the trees from which they fell are still living and will once again bear leaves, so let us think now, not of Jackson Dawson dead but of Jackson Dawson alive with all the fine qualities of his character going on and on into life beautiful and into life eternal.

George Augustus Gardner, an old-time merchant of Boston, died at his home in that city August 6, 1916. He had been connected with the Society since 1895.

Professor William R. Lazenby, Professor of Horticulture and Forestry in the Ohio State University, Columbus, Ohio, died September 15, 1916. In recognition of his work in horticulture he was elected a Corresponding Member of the Society in 1889.

William J. Hoyt of Manchester, New Hampshire, a member of the Society since 1905, died at his home in that city, September 26, 1916, in his 70th year.

George Cartwright of Roxbury, Massachusetts, died November 2, 1916, at the age of 72. Mr. Cartwright was engaged in the nursery business in Dedham for many years and was well known among the commercial growers of Boston and vicinity. He became a member of the Society in 1885.

Charles Abner Campbell of Ipswich, Massachusetts, a member of the Society since 1908, died November 18, 1916, in his 79th year.

In the later years of his life Mr. Campbell was greatly interested in agricultural and horticultural matters. He was a frequent exhibitor of the products of his farm at Ipswich at the exhibitions of the Society.

Livingston Cushing of Weston, Massachusetts, died in New Haven, Connecticut, November 25, 1916, at the age of 61 years. He was admitted a member of the Society in 1895.

Bayard Thayer of Boston, a member of the Society since 1900, died at his residence in Lancaster, Massachusetts, November 29, 1916, at the age of 54. Mr. Thayer was a patron of horticulture and on his estate at Lancaster developed an extensive collection of trees, shrubs, and flowering plants, specimens of which were frequently exhibited at the exhibitions of the Society.

William Crawford Barry of Rochester, New York, president of the Ellwanger & Barry Co. of that city, died December 12, 1916, in his 69th year. Mr. Barry was one of the most widely known horticulturists in the country and for many years was president of the Western New York Horticultural Society. He became a member of the Massachusetts Horticultural Society in 1893.

Mrs. John L. Bremer of Boston, a member of the Society since 1899, died December 12, 1916.

Jerome Jones of Brookline, Massachusetts, prominent in the business activities of Boston, died December 13, 1916, at the age of 79. Mr. Jones became a member of the Society in 1896.

Edward Spaulding of Weston, Massachusetts, a member of the Society since 1864, died December 13, 1916, in his 83d year.

Herbert Jaques of Boston died December 21, 1916, at the age of 59. He was admitted to membership in the Society in 1910.

OFFICERS, COMMITTEES, AND MEMBERS, 1916.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1916.

President.

RICHARD M. SALTONSTALL, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
NATHANIEL T. KIDDER, of Milton.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
GEORGE E. BARNARD, of Ipswich.
ERNEST B. DANE, of Brookline.
WILLIAM C. ENDICOTT, of Boston.
ARTHUR F. ESTABROOK, of Boston.
JOHN K. M. L. FARQUHAR, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Delegate to the State Board of Agriculture.

EDWARD B. WILDER.

Nominating Committee.

ARTHUR F. ESTABROOK
JOHN G. JACK
RICHARD HITTINGER
THOMAS ROLAND
JOHN L. SMITH

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1916.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

RICHARD M. SALTONSTALL.
THOMAS ALLEN, THOMAS ROLAND.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, NATHANIEL T. KIDDER.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
JOHN K. M. L. FARQUHAR, F. C. SEARS.
FRED A. WILSON.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
JOHN K. M. L. FARQUHAR, DUNCAN FINLAYSON,
T. D. HATFIELD, A. H. WINGETT.

Committee on Plants and Flowers.

WILLIAM ANDERSON, *Chairman.*
ARTHUR H. FEWKES, S. J. GODDARD, DONALD McKENZIE,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, RALPH W. REES.

Committee on Vegetables.

JOHN L. SMITH, *Chairman.*
HENRY M. HOWARD, WILLIAM C. RUST.

Committee on Gardens.

RICHARD M. SALTONSTALL, *Chairman.*
DAVID R. CRAIG, JACKSON T. DAWSON,
WILLIAM NICHOLSON, CHARLES SANDER.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
DR. HARRIS KENNEDY, MRS. W. RODMAN PEABODY,
MISS MARGARET A. RAND, JAMES WHEELER.

MEMBERS OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, 1916.

Revised to December 31, 1916.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following lists are inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

1900 Dr. Henry S. Pritchett, Washington, D. C.
1900 Albert Viger, President of the National Society of Horticulture of France, Paris.
1897 Hon. James Wilson, Ex-Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

1901 George Francis Atkinson, Professor of Botany in Cornell University, Ithaca, N. Y.
1889 Dr. L. H. Bailey, Ithaca, N. Y.
1898 John Gilbert Baker, F. R. S., F. L. S., Kew, England.
1875 Professor William J. Beal, Amherst, Mass.
1911 W. J. Bean, Royal Gardens, Kew, England.
1911 John Dunbar, Park Department, Rochester, N. Y.
1887 Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., "Witcombe," Gloucester, England.
1875 Parker Earle, President of the American Horticultural Society, Roswell, N. M.
1887 H. J. Elwes, F. R. S., Colesborne, Cheltenham, England.

1889 William G. Farlow, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge, Mass.
1893 B. E. Fernow, University of Toronto, Ontario.
1900 Dr. Beverly T. Galloway, Department of Agriculture, Washington, D. C.
1877 George Lincoln Goodale, M. D., Cambridge, Mass.
1895 Professor Byron D. Halsted, Botanist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.
1914 C. S. Harrison, York, Nebraska.
1911 Professor U. P. Hedrick, New York Agricultural Experiment Station, Geneva, N. Y.
1907 Augustine Henry, F. L. S., M. R. I. A., Professor of Forestry, Royal College of Science, Dublin, Ireland.
1897 J. W. Hoffmann, Colored State University, Orangeburg, S. C.
1906 Senor Don Salvador Izquierdo, Santiago, Chile.
1911 Émile Lemoine, Nancy, France.
1875 T. C. Maxwell, Geneva, N. Y.
1911 J. Ewing Mears, M. D., Philadelphia, Pa.
1911 Wilhelm Miller, Superintendent of Horticulture, University of Illinois, Urbana, Illinois.
1898 Sir Frederick W. Moore, Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
1887 Sir Daniel Morris, C. M. G., D.Sc., M. A., F. L. S.
1898 Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania, Norway.
1912 C. Harman Payne, London, England.
1906 Sir David Prain, C. I. E., C. M. G., F. R. S., Director of the Royal Botanic Gardens, Kew, England.
1894 Cavalière Enrico Ragusa, Palermo, Sicily.
1906 Dr. Henry L. Ridley, C. M. G., F. R. S., Kew, England.
1898 Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, Mass.
1875 William Robinson, London, England.
1899 William Salway, Superintendent of Spring Grove Cemetery Cincinnati, O.
1875 Robert W. Starr, Wolfville, N. S.
1893 Professor William Trelease, University of Illinois, Urbana, Illinois.
1882 H. J. Veitch, Chelsea, England.
1905 Maurice L. de Vilmorin, Paris, France.
1905 Philippe L. de Vilmorin, Paris, France.
1912 Professor Hugo de Vries, University of Amsterdam, Amsterdam, Holland.
1894 William Watson, Curator of Royal Botanic Gardens, Kew, England.

1906 Miss E. Willmott, Essex, England.
1911 E. H. Wilson, Jamaica Plain, Mass.
1901 Professor L. Wittmack, Secretary of the Royal Prussian Horticultural Society, Berlin, Prussia.

LIFE MEMBERS.

1899 Adams, Mrs. Charles Francis, South Lincoln.
1907 Adams, George E., Kingston, R. I.
1897 Adams, Henry Saxton, Jamaica Plain.
1899 Agassiz, Mrs. George R., Yarmouth Port.
1894 Allen, Hon. Charles H., Lowell.
1916 Allen, Edward Ellis, Watertown.
1905 Allen, Mrs. Sarah R., Wilmington.
1898 Allen, Thomas, Boston.
1899 Ames, F. Lothrop, North Easton.
1914 Ames, Mrs. F. L., North Easton.
1899 Ames, John S., North Easton.
1894 Ames, Oakes, North Easton.
1899 Ames, Oliver, North Easton.
1900 Ames, Mrs. Oliver, Sr., North Easton.
1867 Amory, Frederic, Boston.
1899 Anderson, Larz, Brookline.
1911 Anderson, William, South Lancaster.
1864 Andrews, Charles L., Milton.
1871 Appleton, Hon. Francis H., Boston.
1914 Appleton, Francis R., New York, N. Y.
1913 Appleton, Henry Saltonstall, Boston.
1914 Apthorp, Mrs. Harrison O., Milton.
1900 Arnold, Mrs. George Francis, Brookline.
1894 Ash, John, Pomfret Centre, Conn.
1890 Atkins, Edwin F., Belmont.
1914 Ayer, Mrs. Frederick, Boston.
1899 Ayer, James B., Boston.

1912 Bache, James S., Sharon, Conn.
1905 Backer, Clarence A., Melrose.
1914 Bacon, Miss E. S., Jamaica Plain.
1905 Badger, Walter I., Cambridge.
1894 Bailey, Jason S., West Roxbury.
1902 Bailey, Robert M., Dedham.
1902 Baker, Clifton P., Dedham.
1901 Baker, James E., South Lincoln.
1904 Balch, Joseph, Dedham.
1909 Baldwin, Frank F., Hopkinton.
1888 Barber, J. Wesley, Newton.
1904 Barker, George, Swampscott.
1905 Barnard, George E., Ipswich.
1866 Barnes, Walter S., Brookline.
1904 Barney, Arthur F., Dorchester.
1867 Barney, Levi C., Boston.
1897 Barry, John Marshall, Boston.
1901 Bartlett, Miss Mary F., Boston.
1914 Bartol, Dr. John W., Boston.
1915 Bartsch, Hermann H., Waverley.
1901 Bates, Miss Mary D., Ipswich.
1915 Bauernfeind, John, Medford.
1899 Baylies, Walter C., Taunton.
1914 Beal, Mrs. Boylston, Boston.
1905 Beal, Thomas P., Boston.
1891 Becker, Frederick C., Cambridge.
1876 Beckford, Daniel R., Jr., Dedham.
1894 Beebe, E. Pierson, Boston.

1890 Beebe, Franklin H., Boston.
1905 Bemis, Frank B., Beverly.
1914 Bemis, Mrs. Frank B., Beverly.
1899 Bigelow, Albert S., Cohasset.
1914 Bigelow, Charles, Brookline.
1899 Bigelow, Joseph S., Cohasset.
1899 Bigelow, Dr. William Sturgis, Boston.
1899 Black, George N., Manchester.
1885 Blake, Mrs. Arthur W., Brookline.
1914 Blake, Benjamin S., Auburndale.
1897 Blake, Edward D., Boston.
1908 Blood, Eldredge H., Swampscott.
1905 Boardman, Miss Eliza D., Boston.
1899 Boardman, T. Dennie, Manchester.
1914 Boit, Miss Elizabeth E., Wakefield.
1894 Bosler, Frank C.,Carlisle, Penn.
1914 Bowditch, Alfred, Jamaica Plain.
1887 Bowditch, Charles P., Jamaica Plain.
1897 Bowditch, Ernest W., Milton.
1883 Bowditch, James H., Brookline.
1894 Bowditch, Nathaniel I., Framingham.
1877 Bowditch,William E., Roxbury.
1913 Brackett, C. Henry B., Boston.
1912 Bradley, Charles H., Boston.
1914 Brandegee, Mrs. Edward D., Brookline.
1900 Breck, Joseph Francis, Waban.
1914 Breck, Luther Adams, Newton.
1871 Bresee, Albert, Hubbardton, Vt.
1914 Brewer, Edward M., Milton.
1914 Brewer, Joseph, Milton.
1905 Brewster, William, Cambridge.
1910 Briggs, Mrs. George R., Plymouth.
1897 Briggs, William S., Lincoln.
1873 Brigham, William T., Honolulu, Hawaii.
1909 Brooke, Edmund G., Jr., Providence, R. I.
1914 Brooks, Miss Fanny, Readville.
1914 Brooks, Henry G., Milton.
1899 Brooks, Peter C., Boston.
1899 Brooks, Shepherd, Boston.
1912 Brooks, Walter D., Milton.
1909 Brown, Mrs. John Carter, Providence, R. I.
1907 Brush, Charles N., Brookline.
1915 Buckminster, W. B., Malden.
1906 Buitta, Vincent, Newton Upper Falls.
1914 Bullard, Alfred M., Milton.
1897 Burlen, William H., East Holliston.
1895 Burnett, Harry, Southborough.
1911 Burnett, John T., Southborough.
1914 Burnett, Robert M., Southborough.
1914 Burnham, Miss Helen C., Boston.
1909 Burr, I. Tucker, Milton.
1906 Burrage, Albert C., Boston.
1868 Butler, Aaron, Wakefield.
1907 Butterworth, George William, South Framingham.
1906 Butterworth, J. Thomas, South Framingham.
1905 Buttrick, Stedman, Concord.

1902 Cabot, George E., Boston.
1914 Cabot, Henry B., Brookline.
1870 Calder, Augustus P., Brookline.
1896 Cameron, Robert, Cambridge.
1913 Campbell, Chester I., Wollaston.
1891 Campbell, Francis, Cambridge.
1905 Carr, Samuel, Boston.
1893 Carter, Charles N., Needham.
1899 Casas, W. B. de las, Malden.
1911 Case, Miss Marian Roby, Weston.

1873 Chamberlain, Chauncy W., Waban.
1909 Chamberlain, Montague, Groton.
1903 Chapman, John L., Prides Crossing.
1878 Chase, Joseph S., Malden.
1909 Chase, Philip Putnam, Milton.
1895 Cheney, Mrs. Elizabeth S., Wellesley.
1894 Christie, William, Everett.
1876 Clapp, Edward B., Dorchester.
1871 Clapp, William C., Dorchester.
1896 Clark, B. Preston, Cohasset.
1896 Clark, Miss Eleanor J., Pomfret Centre, Conn.
1907 Clark, Herbert A., Belmont.
1890 Clark, J. Warren, Millis.
1910 Clark, Winslow, Milton.
1899 Clarke, Eliot C., Boston.
1914 Clifford, Charles P., Milton.
1895 Clough, Micajah Pratt, Lynn.
1894 Cobb, John C., Milton.
1914 Cochrane, Alexander, Boston.
1906 Codman, Miss Catherine A., Westwood.
1871 Codman, James M., Brookline.
1914 Codman, James M., Jr., Brookline.
1901 Coe, Miss Mary Alma, Boston.
1903 Cogswell, Edward R., Jr., Newton Highlands.
1900 Cole, Edward E., Boston.
1882 Collins, Frank S., North Eastham.
1914 Collins, William J., Brookline.
1902 Comley, Norris F., Lexington.
1899 Converse, Col. H. E., Marion.
1913 Cook, Thomas N., Watertown.
1914 Coolidge, Charles A., Boston.
1902 Coolidge, Harold J., Boston.
1899 Coolidge, J. Randolph, Chestnut Hill.
1899 Coolidge, Mrs. J. Randolph, Chestnut Hill.
1914 Cotting, Charles E., Boston.
1914 Cotting, Mrs. Charles E., Boston.
1892 Cottle, Henry C., Boston.
1914 Councilman, Dr. W. T., Boston.
1913 Cox, Simon F., Mattapan.
1892 Cox, Thomas A., Dorchester.
1914 Crafts, Miss Elizabeth S., Boston.
1910 Craig, David R., Boston.
1901 Craig, William Nicol, Brookline.
1899 Crane, Zenas, Dalton.
1891 Crawford, Dr. Sarah M., Roxbury.
1891 Crocker, Miss Sarah H., Boston.
1914 Crompton, Miss Isabel M., Worcester.
1887 Crosby, George E., West Medford.
1914 Crosby, Mrs. S. V. R., Boston.
1901 Cross, Alfred Richard, North Cohasset.
1909 Cumner, Mrs. Nellie B., Brookline.
1856 Curtis, Charles F., Jamaica Plain.
1899 Curtis, Charles P., Boston.
1906 Cutler, Mrs. Charles F., Boston.
1903 Cutler, Judge Samuel R., Revere.

1897 Damon, Frederick W., Arlington.
1908 Dane, Ernest B., Brookline.
1908 Dane, Mrs. Ernest B., Brookline.
1899 Daniels, Dr. Edwin A., Boston.
1909 Danielson, Mrs. J. DeForest, Boston.
1892 Davenport, Albert M., Watertown.
1902 Davis, Arthur E., Dover.
1902 Davis, Mrs. Arthur E., Dover.
1913 Davis, Bancroft Chandler, Weston.
1916 Davis, Miss Helen I., Wellesley.
1914 Davis, Livingston, Milton.

1909 Dawson, Henry Sargent, Jamaica Plain.
1905 Day, Henry B., West Newton.
1873 Denny, Clarence H., Boston.
1904 Dexter, Gordon, Beverly Farms.
1904 Dexter, Philip, Beverly.
1866 Dike, Charles C., Stoneham.
1896 Donald, William, Cold Spring Harbor, N. Y.
1900 Donaldson, James, Roxbury.
1907 Doten, Scott T., Lincoln.
1914 Douglass, Alfred, Brookline.
1910 Downs, William, Chestnut Hill.
1893 Dowse, William B. H., West Newton.
1899 Draper, George A., Hopedale.
1896 Dreer, William F., Philadelphia, Pa.
1897 Dumaresq, Herbert, Chestnut Hill.
1899 Duncan, James L., New York, N. Y.
1902 Duncan, John W., Spokane, Wash.
1896 Dunlap, James H., Nashua, N. H.
1915 Dunn, Stephen Troyte, F. L. S., F. R. G. S., Kew, England.
1915 Dupee, William Arthur, Milton.
1909 Dupuy, Louis, Whitestone, L. I., N. Y.
1852 Durfee, George B., Fall River.
1880 Dutcher, Frank J., Hopedale.
1900 Dwight, Theodore F., Kendal Green.
1902 Dyer, Herbert H., Arlington.
1912 Eaton, Harris D., Southborough.
1911 Edgar, Mrs. Rose H., Waverley.
1912 Edgar, William Percival, Jamaica Plain.
1895 Eldredge, H. Fisher, Boston.
1887 Elliott, Mrs. John W., Boston.
1888 Elliott, William H., Brighton.
1903 Ellsworth, J. Lewis, Worcester.
1907 Emerson, Nathaniel W., M.D., Boston.
1894 Endicott, William, Boston.
1899 Endicott, William C., Danvers.
1915 Ernst, Mrs. Harold C., Jamaica Plain.
1897 Estabrook, Arthur F., Boston.
1905 Estabrook, Mrs. Arthur F., Boston.
1907 Eustis, Miss Elizabeth M., Brookline.
1907 Eustis, Miss Mary St. Barbe, Brookline.
1914 Evans, Mrs. Robert D., Boston.

1915 Fairbanks, Charles F., Milton.
1881 Fairchild, Charles, New York, N. Y.
1877 Falconer, William, Pittsburg, Pa.
1884 Farlow, Lewis H., Boston.
1896 Farnsworth, Mrs. William, Dedham.
1890 Farquhar, James F. M., Roslindale.
1891 Farquhar, John K. M. L., Roxbury.
1915 Farquhar, Mrs. John K. M. L., Roxbury.
1884 Farquhar, Robert, North Cambridge.
1873 Faxon, John, Quincy.
1899 Fay, H. H., Woods Hole.
1915 Fay, Mrs. Harry F., Lexington.
1908 Fay, Wilton B., West Medford.
1914 Fearing, George R., Jr., Boston.
1899 Fessenden, George B., Allston.
1883 Fewkes, Arthur H., Newton Highlands.
1904 Finlayson, Duncan, Jamaica Plain.
1892 Finlayson, Kenneth, Jamaica Plain
1901 Fisher, Peter, Ellis.
1910 Flanagan, Joseph F., Newton.
1882 Fletcher, George V., Belmont.
1883 Fletcher J. Henry, Belmont.
1914 Forbes, Alexander, M.D., Milton.

1909 Forbes, Charles Stewart, Boston.
1909 Forbes, Mrs. J. Malcolm, Milton.
1914 Forbes, W. Cameron, Westwood.
1909 Forbes, Mrs. William H., Milton.
1914 Foster, Alfred D., Milton.
1899 Foster, Charles H. W., Needham.
1885 Fottler, John, Jr., Dorchester.
1881 Fowle, George W., Jamaica Plain.
1914 Fraser, Charles E. K., South Natick.
1911 Freeman, Mrs. James G., Boston.
1910 French, Mrs. Albert M., Reading.
1892 French, S. Waldo, Newtonville.
1893 French, W. Clifford, Brookline.
1882 Frohock, Roscoe R., Boston.
1903 Frost, Harold L., Arlington.
1900 Frost, Irving B., Belmont.
1899 Frothingham, Mrs. Louis A., Boston.

1910 Galloupe, Frederic R., Lexington.
1914 Gannett, Samuel, Milton.
1914 Gardiner, Robert H., Gardiner, Maine.
1901 Gardner, Mrs. Augustus P., Hamilton.
1895 Gardner, George P., Boston.
1899 Gardner, John L., Boston.
1899 Gardner, Mrs. John L., Brookline.
1899 Gardner, William Amory, Groton.
1910 Garland, Mrs. Marie T., Buzzards Bay.
1904 Garratt, Allan V., Holliston.
1899 Gaston, William A., Boston.
1911 Gavin, Frank D., Manchester.
1910 Geiger, Albert, Jr., Brookline.
1911 Gill, Miss Adeline Bradbury, Medford.
1911 Gill, Miss Eliza M., Medford.
1865 Gill, Mrs. E. M., Medford.
1887 Gill, George B., Medford.
1870 Gilson, F. Howard, Wellesley Hills.
1907 Goddard, Samuel J., Framingham.
1904 Goodale, Dr. Joseph L., Boston.
1885 Goodell, L. W., Dwight.
1899 Gray, Mrs. John C., Boston.
1914 Greene, Edwin Farnham, Boston.
1905 Greenough, Mrs. Charles P., Brookline.
1912 Greenough, Mrs. David S., Jamaica Plain.
1914 Grew, Mrs. Edward S., Boston.
1914 Grew, Edward W., Boston.

1897 Hale, James O., Byfield.
1873 Hall, Edwin A., Cambridgeport.
1912 Hall, Mrs. George G., Boston
1899 Hall, Jackson E., Cambridge.
1897 Hall, Osborn B., Malden.
1910 Halloran, Edward J., Roxbury.
1913 Handler, Max Paul, South Natick.
1914 Harding, Charles L., Dedham.
1863 Harding, George W., Arlington.
1869 Harding, Louis B., Chestnut Hill.
1871 Hardy, F. D., Cambridgeport.
1905 Hardy, Miss Susan White, Boston.
1889 Hargraves, William J., Jamaica Plain.
1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1899 Hartshorn, Arthur E., Worcester.
1914 Hartt, Arthur W., Brookline.
1895 Harwood, George Fred, Newton.
1884 Hastings, Levi W., Brookline.

1906 Hauthaway, Edwin D., Sharon.
1914 Havemeyer, Theodore A., New York, N. Y.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1914 Haywood, H. T., Franklin.
1905 Head, Thomas W., Lake Forest, Ill.
1913 Heeremans, F., Lenox.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1914 Hemenway, Augustus, Jr., Boston.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary Crane, Cambridge.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J. Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1914 Hollingsworth, Valentine, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Ellen, Sheen, Surrey, Eng.
1914 Hornblower, Henry, Boston.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.
1902 Hosmer, Oscar, Wenham.
1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1915 Howes, Mrs. Ernest, Boston.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1913 Huebner, H., Groton.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.
1904 Hutchins, Rev. Charles Lewis, Concord.

1893 Jack, John George, East Walpole.
1886 Jackson, Charles L., Boston.
1914 Jackson, Mrs. James, Jr., Westwood.
1884 Jackson, Robert T., Peterborough, N. H.
1916 Jahn, Paul H., East Bridgewater.
1916 Jahn, William O., East Bridgewater.
1902 James, Ellerton, Milton.

1902 James, Mrs. Ellerton, Milton.
1899 James, George Abbot, Nahant.
1913 Jeffries, John Temple L., Cambridge.
1899 Jeffries, William A., Boston.
1865 Jenks, Charles W., Bedford.
1905 Johnson, Arthur S., Boston.
1914 Johnson, Edward C., Boston.
1885 Johnson, J. Frank, Malden.
1907 Jones, Mrs. Clarence W., Brookline.
1897 Jones, Dr. Mary E., Boston.
1900 Jordan, Henry G., Hingham Centre.

1897 Kellen, William V., Marion.
1886 Kelly, George B., Jamaica Plain.
1848 Kendall, D. S., Woodstock, Ont.
1891 Kendall, Dr. Walter G., Atlantic.
1868 Kennedy, George G., M. D., Milton.
1909 Kennedy, Harris, M. D., Milton.
1905 Keyes, Mrs. Emma Mayer, Boston.
1891 Keyes, John M., Concord.
1889 Kidder, Charles A., Southborough.
1910 Kidder, Mrs. Henry P., Boston.
1880 Kidder, Nathaniel T., Milton.
1899 Kimball, David P., Boston.
1903 Kimball, Richard D., Waban.
1899 King, D. Webster, Boston.
1865 Kingman, Abner A., Wakefield.
1899 Kinney, H. R., Worcester.
1906 Kinnicutt, Mrs. Leonard P., Worcester.
1904 Kirkland, Archie Howard, Reading.

1899 Lamb, Horatio A., Milton.
1913 Lancaster, Dr. Walter B., Brookline.
1899 Lanier, Charles, Lenox.
1895 Lawrence, Amos A., New York, N. Y.
1873 Lawrence, John, Groton.
1899 Lawrence, Rt. Rev. William, Boston.
1895 Lee, Daniel D., Jamaica Plain.
1914 Lee, George C., Westwood.
1914 Lee, Mrs. George C., Westwood.
1880 Leeson, Hon. Joseph R., Newton Centre.
1902 Leighton, George B., Monadnock, N. H.
1914 Leland, Lester, Boston.
1914 Leland, Mrs. Lester, Boston.
1871 Lemme, Frederick, Charlestown.
1903 Libby, Charles W., Medford.
1899 Little, John Mason, Swampscott.
1899 Locke, Isaac H., Belmont.
1891 Lodge, Richard W., Redlands, Cal.
1897 Loomis, Elihu G., Bedford.
1899 Loring, Augustus P., Beverly.
1905 Loring, David, Boston.
1914 Loring, Miss Katharine P., Prides Crossing.
1914 Loring, Miss Louisa P., Prides Crossing.
1899 Loring, Mrs. William Caleb, Beverly.
1899 Lowell, Abbott Lawrence, Boston.
1902 Lowell, Miss Amy, Brookline.
1903 Lowell, James A., Chestnut Hill.
1903 Lowell, John, Newton.
1904 Lowell, Miss Lucy, Boston.
1899 Luke, Otis H., Brookline.
1895 Lunt, William W., Hingham.
1914 Lyman, C. Frederic, Boston.
1895 Lyman, George H., Wareham.

1898 Mabbett, George, Plymouth.
1912 MaKay, Alexander, Jamaica Plain.

1911 McKenzie, Donald, Chestunt Hill.
1868 Mahoney, John, Boston.
1892 Mallett, E. B., Jr., Freeport, Me.
1884 Manda, W. A., South Orange, N. J.
1906 Mandell, Mrs. William D., Boston.
1873 Mann, James F., Ipswich.
1887 Manning, J. Woodward, Reading.
1884 Manning, Warren H., Brookline.
1909 Marlborough, James, Topsfield.
1913 Marshall, A. A., Fitchburg.
1876 Marshall, Frederick F., Everett.
1898 Marston, Howard, Brookline.
1899 Mason, Miss Ellen F., Boston.
1896 Mason,Col. Frederick,Taunton.
1914 Mathews, Miss Elizabeth Ashby, Newton Center.
1901 Matthews, Nathan, Boston.
1906 Maxwell, George H., Newton.
1902 Melvin, George, South Framingham.
1905 Meredith, J. Morris, Topsfield.
1881 Merriam, Herbert, Weston.
1884 Metivier, James, Waltham.
1914 Meyer, George von L., Hamilton.
1914 Mifflin, George H., Boston.
1914 Miller, Peter M., Mattapan.
1888 Milmore, Mrs. Joseph, Washington, D. C.
1915 Minot, Mrs. Charles S., Readville.
1908 Minot, Laurence, Boston.
1892 Monteith, David, Hyde Park, Vt.
1896 Montgomery, Alexander, Natick.
1902 Montgomery, Alexander, Jr., Natick.
1896 Moore, George D., Arlington.
1881 Moore, John H., Concord.
1897 Morgan, George H., New York, N. Y.
1914 Morgan, Mrs. J. P., New York, N. Y.
1913 Morison, Robert S., Cambridge.
1899 Morse, John T., Boston.
1909 Morse, John Torrey, 3d., Boston.
1910 Morse, Lewis Kennedy, Boxford.
1913 Morse, Robert C., Milton.
1900 Morse, Robert M., Jamaica Plain.
1914 Morss, Charles A., Chestnut Hill.
1914 Morss, Mrs. Charles A., Chestnut Hill.
1902 Morton, James H., Huntington, N. Y.
1896 Moseley, Charles H., Roxbury.
1909 Moseley, Charles W., Newburyport.
1896 Moseley, Frederick Strong, Newburyport.
1914 Munroe, Howard M., Lexington.
1900 Murray, Peter, Fairhaven.
1897 Mutch, John, Waban.

1899 Nevins, Mrs. David, Methuen.
1914 Newbold, Frederic R., New York, N. Y.
1874 Newman, John R., Winchester.
1874 Newton, Rev. William W., Pittsfield.
1914 Nicholson, William R., Framingham.
1906 Nickerson, William E., Cambridge.
1914 Norman, Mrs. Louisa P., New port, R. I.
1881 Norton, Charles W., Allston.
1891 Norton, Edward E., Boston.

1912 O'Conner, John, Brookline.

1898 Olmsted, Frederick Law, Jr., Brookline.
1892 Olmsted, John C., Brookline.
1898 Orpet, Edward O., Lake Forest, Ill.

1909 Page, George, Newton Highlands.
1909 Page, George William, South Lincoln.
1900 Page, Mrs. Henrietta, Cambridge.
1884 Paige, Clifton H., Mattapan.
1914 Paine, Robert Treat, 2d, Boston.
1908 Parker, Augustine H., Dover.
1913 Parker, Edgar, North Easton.
1911 Parker, Edward, North Easton.
1915 Parker, Miss Eleanor S., Bedford.
1891 Parkman, Henry, Boston.
1899 Parsons, John E., Lenox.
1914 Patten, Miss Jane B., South Natick.
1897 Patten, Marcellus A., Tewksbury.
1909 Peabody, Francis, Milton.
1909 Peabody, Mrs. Francis, Milton.
1905 Peabody, Frank E., Boston.
1899 Peabody, George A., Danvers.
1881 Peabody, John E., Salem.
1907 Peirce, E. Allan, Waltham.
1916 Peirce, Edward R., Wellesley Farms.
1914 Peirson, Charles Lawrence, Boston.
1915 Penn, Henry, Brookline.
1899 Pentecost, Mrs. Ernest Harvey, Topsfield.
1873 Perry, George W., Malden.
1899 Pfaff, Col. Charles, South Framingham.
1900 Phillips, John C., North Beverly.
1899 Phillips, Mrs. John C., North Beverly.
1899 Phillips, William, North Beverly.
1895 Pickman, Dudley L., Boston.
1902 Pickman, Mrs. Ellen R., Boston.
1881 Pierce, Dean, Brookline.
1892 Pierce, George Francis, Neponset.
1905 Pierce, Wallace L., Boston.
1905 Pierson, Frank R., Tarrytown, N. Y.
1914 Pingree, David, Salem.
1900 Pond, Preston, Winchester.
1892 Porter, James C., Wollaston.
1884 Pratt, Laban, Dorchester.
1868 Pratt, Robert M., Boston.
1914 Pratt, Waldo E., Wellesley Hills.
1898 Pray, James Sturgis, Cambridge.
1899 Prendergast, James M., Boston.
1858 Prescott, Eben C., New York, N. Y.
1914 Preston, Andrew W., Swampscott.
1903 Preston, Howard Willis, Providence, R. I.
1911 Priest, Lyman F., Gleasondale.
1912 Proctor, Henry H., Boston.
1901 Proctor, Thomas E., Boston.
1899 Putnam, George, Manchester.
1900 Putnam, George J., Brookline.

1886 Quimby, Hosea M., M. D., Worcester.

1889 Rand, Harry S., North Cambridge.
1908 Rand, Miss Margaret A., Cambridge.
1903 Rawson, Herbert W., Arlington.
1882 Ray, James F., Franklin.
1890 Raymond, Walter, Pasadena, Cal.
1891 Read, Charles A., Manchester.
1902 Reardon, Edmund, Cambridgeport.

1892 Reardon, John B., Boston.
1912 Reiff, William, Forest Hills.
1905 Remick, Frank W., West Newton.
1889 Rice, George C., Worcester.
1887 Rich, William P., Chelsea.
1876 Richards, John J., Brookline.
1899 Richardson, Mrs. F. L. W., Charles River Village.
1912 Richardson, H. H., Brookline.
1900 Richardson, Dr. William L., Boston.
1905 Riggs, William Allan, Auburndale.
1886 Ripley, Charles, Dorchester.
1892 Ripley, Ebed L., Hingham Centre.
1903 Robb, Russell, Concord.
1909 Roberts, Miss Anna B., Boston.
1909 Robinson, Alfred E., Lexington.
1871 Robinson, John, Salem.
1900 Rodman, Miss Mary, Concord.
1903 Roffe, Albert H., Newton Centre.
1911 Rogers, Dexter M., Allston.
1914 Rogers, Dudley P., Danvers.
1899 Rogers, Mrs. Jacob C., Peabody.
1900 Roland, Thomas, Nahant.
1910 Ross, Harold S., Hingham.
1895 Rothwell, James E., Brookline.
1899 Roy, David Frank, Marion.
1881 Ruddick, William H., M. D., South Boston.
1875 Russell, George, Woburn.
1900 Russell, James S., Milton.
1914 Russell, Mrs. Robert S., Boston.

1893 Salisbury, William C. G., Brookline.
1915 Saltonstall, Mrs. Caroline S., Milton.
1912 Saltonstall, John L., Beverly.
1912 Saltonstall, Mrs. John L., Beverly.
1899 Saltonstall, Richard M., Chestnut Hill.
1898 Sanger, Mrs. George P., Boston.
1900 Sargent, Andrew Robeson, Brookline.
1870 Sargent, Charles S., Brookline.
1899 Sargent, Mrs. Charles S., Brookline.
1902 Sargent, Charles Sprague, Jr., Brookline.
1899 Sargent, Mrs. Francis W., Wellesley.
1896 Scorgie, James C., Cambridge.
1864 Scott, Charles, Newton.
1895 Sears, Miss Clara E., Boston.
1899 Sears, Dr. Henry F., Boston.
1914 Sears, Horace S., Weston.
1899 Sears, Mrs. J. Montgomery, Boston.
1898 Sharp, Miss Helen, Boston.
1914 Shattuck, Dr. Frederick C., Boston.
1914 Shattuck, Mrs. Frederick C., Boston.
1899 Shaw, Francis, Wayland.
1914 Shaw, Henry S., Milton.
1899 Shaw, Mrs. Robert G., Wellesley.
1901 Shea, James B., Jamaica Plain.
1906 Sherman, J. P. R., Newton.
1865 Shorey, John L., Lynn.
1892 Shuman, Hon. A., Boston.
1901 Shurtleff, Josiah B., Revere.
1893 Siebrecht, H. A., New Rochelle, N. Y.
1899 Sleeper, Henry Davis, Boston.
1903 Smiley, Daniel, Lake Mohonk, N. Y.
1888 Smith, Charles S., Lincoln.
1872 Smith, Edward N., San Francisco, Cal.
1911 Smith, John L., Swampscott.
1888 Smith, Thomas Page, Waltham.
1874 Snow, Eugene A., Cambridge.
1899 Sohier, Col. William D., Beverly.

1908 Spaulding, John T., Prides Crossing.
1908 Spaulding, William S., Prides Crossing.
1897 Sprague, Isaac, Wellesley Hills.
1884 Stearns, Charles H., Brookline.
1893 Stearns, Frank W., Newton.
1896 Stedman, Henry R., M. D., Brookline.
1914 Stevens, Mrs. Nathaniel, North Andover.
1885 Stewart, William J., Winchester.
1901 Stone, Charles A., Newton.
1889 Stone, Charles W., Boston.
1910 Stone, Mrs. Francis H., South Dartmouth.
1914 Stone, Galen L., Brookline.
1896 Stone, Prof. George E., Amherst.
1849 Stone, George F., Chestnut Hill.
1914 Stone, J. Winthrop, Watertown.
1914 Stone, Nathaniel H., Milton.
1905 Storrow, James J., Boston.
1905 Stratton, Charles E., Boston.
1906 Strout, Charles S., Biddeford, Me.
1914 Sturgis, Miss Evelyn R., Manchester.
1902 Sturgis, Richard Clipston, Boston.
1916 Sturtevant, Miss Grace, Wellesley Farms.
1910 Sullivan, Martin, Jamaica Plain.
1912 Swan, Charles H., Jamaica Plain.
1891 Sweet, Everell F., Malden.
1916 Swett, Raymond W., Saxonville.
1904 Sylvester, Edmund Q., Hanover.

1899 Taylor, Charles H., Boston.
1900 Taylor, Mrs. Thomas, Jr., Columbia, S. C.
1913 Tedcastle, Mrs. Arthur W., Hyde Park.
1896 Tenney, Charles H., Methuen.
1912 Thatcher, Arthur E., Bar Harbor, Me.
1898 Thatcher, William, Brookline.
1899 Thayer, Mrs. Alice R., Boston.
1900 Thayer, Mrs. Bayard, South Lancaster.
1899 Thayer, Mrs. Eugene V. R., South Lancaster.
1903 Thayer, Henry J., Boston.
1899 Thayer, John E., South Lancaster.
1899 Thayer, Mrs. John E., South Lancaster.
1899 Thayer, Mrs. Nathaniel, Lancaster.
1899 Thiemann, Hermann, Owosso, Mich.
1899 Thomas, W. B., Manchester.
1910 Thurlow, George C., West Newbury.
1913 Thurlow, Winthrop H., West Newbury.
1874 Tolman, Miss Harriet S., Boston.
1896 Toppan, Roland W., Malden.
1899 Tower, Miss Ellen May, Lexington.
1901 Tower, Mrs. Helen M., Cambridge.
1914 Towle, L. D., Newton.
1893 Trepess, Samuel J., Glencove, L. I., N. Y.
1910 Turner, Chester Bidwell, Stoughton.
1914 Tyler, Charles H., Boston.

1910 Underwood, Henry O., Belmont.
1901 Underwood, Loring, Belmont.

1873 Vander-Woerd, Charles, Waltham.
1899 Vaughan, William Warren, Boston.

1884 Vinal, Miss Mary L., Somerville.

1916 Wagstaff, Archibald, Wellesley Hills.
1909 Wainwright, Arthur, Milton.
1849 Wakefield, E. H., Cambridge.
1876 Walcott, Henry P., M. D., Cambridge.
1895 Waldo, C. Sidney, Jamaica Plain.
1914 Walker, William B., Manchester.
1896 Walsh, Michael H., Woods Hole.
1901 Waltham, George C., Dorchester.
1907 Walton, Arthur G., Wakefield.
1902 Warburton, Chatterton, Fall River.
1912 Wardwell, Mrs. T. Otis, Haverhill.
1894 Ware, Miss Mary L., Boston.
1909 Warren, Bentley W., Boston.
1889 Watson, Benjamin M., Jamaica Plain.
1884 Watson, Thomas A., East Braintree.
1914 Watters, W. F., Boston.
1905 Webster, Edwin S., Chestnut Hill.
1914 Webster, Mrs. Edwin S., Chestnut Hill.
1905 Webster, Frank G., Boston.
1907 Webster, George H., Haverhill.
1896 Webster, Hollis, Cambridge.
1905 Webster, Laurence J., Holderness, N. H.
1909 Weeks, Andrew Gray, Marion.
1901 Welch, David, Dorchester.
1902 Welch, Edward J., Dorchester.
1914 Weld, Mrs. Charles G., Brookline.
1884 Weld, Christopher Minot, Readville.
1899 Weld, Gen. Stephen M., Wareham.
1914 Weld, Mrs. Stephen M., Wareham.
1912 Wellington, Mrs. Arthur W., Boston.
1882 West, Mrs. Maria L., Neponset.
1887 Wheeler, Frank, Concord.
1889 Wheeler, James, Natick.
1897 Wheeler, Wilfrid, Concord.
1865 Whitcomb, William B., Medford.
1901 White, Mrs. Charles T., Boston.
1865 White, Francis A., Brookline.
1899 White, George R., Boston.
1909 White, Harry K., Milton.
1905 Whitman, William, Brookline.
1894 Whitney, Arthur E., Winchester.
1894 Whitney, Ellerton P., Milton
1899 Whitney, Henry M., Cohasset.
1915 Wigglesworth, Frank, Milton.
1899 Wigglesworth, George, Milton.
1863 Wilbur, George B., Boston.
1889 Wilde, Mrs. Albion D., West Roxbury.
1881 Wilder, Edward Baker, Dorchester.
1899 Williams, Miss Adelia Coffin, Roxbury.
1905 Williams, George Percy, Boston.
1899 Williams, John Davis, Boston.
1905 Williams, Mrs. J. Bertram, Cambridge.
1905 Williams, Mrs. Moses, Brookline.
1871 Williams, Philander, Taunton.
1911 Williams, Ralph B., Dover.
1915 Wilson, E. H., Jamaica Plain.
1914 Wilson, Fred A., Nahant.
1881 Wilson, William Power, Boston.
1905 Winsor, Robert, Weston.

1906 Winter, Herman L., Portland, Me.
1914 Winthrop, Greenville L., Lenox.
1914 Winthrop, Mrs. Robert, New York, N. Y.
1914 Winthrop, Mrs. Robert C., Jr., Boston.
1870 Wood, William K., Franklin.
1905 Woodberry, Miss E. Gertrude, North Cambridge.
1905 Woodbury, John, Canton.
1906 Woodward, Mrs. Samuel Bayard, Worcester.
1900 Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

1913 Adams, Charles F., Jamaica Plain.
1896 Anderson, George M., Milton.

1912 Babcock, Miss Mabel Keyes, Wellesley Hills.
1911 Bacon, Augustus, Roxbury.
1915 Baker, Mrs. G. B., Chestnut Hill.
1865 Barker, John G., South Bend, Ind.
1898 Barr, John, South Natick.
1916 Barron, Leonard, Garden City, N. Y.
1893 Bigelow, Mrs. Nancy J., Southborough.
1901 Bradley, Miss Abby A., Hingham.
1913 Bradley, Miss Julia H., Roxbury.
1873 Breck, Charles H., Newton.
1902 Breed, Edward W., Clinton.
1908 Briggs, Frank P., Ayer.
1909 Brigham, Mrs. Clifford, Milton.
1914 Brown, F. Howard, Marlboro.
1916 Brown, Mrs. G. Winthrop, Chestnut Hill.
1908 Butler, E. K., Jamiaca Plain.

1914 Campbell, Ernest W., Wollaston.
1910 Camus, Emil, Boston.
1904 Chandler, Alfred D., Brookline.
1910 Churchill, Charles E., Rockland.
1916 Clark, Schuyler S., Brookline.
1912 Clarke, Mrs. Herbert L., Reading.
1914 Colt, James D., Chestnut Hill.
1907 Colt, Mrs. James D., Chestnut Hill.
1915 Copson, William A., Roslindale.
1914 Crocker, Mrs. George Glover, Boston.
1914 Crocker, Joseph Ballard, Chatham.
1914 Crompton, Miss Mary A., Worcester.
1881 Crosby, J. Allen, Jamaica Plain.
1875 Curtis, Joseph H., Boston.
1914 Cushing, Mrs. Harvey, Brookline.
1912 Cutler, Mrs. N. P., Newton.
1906 Cutting, Mrs. Isabelle Ladd, Roxbury.

1910 Dahl, Frederick William, Roxbury.
1889 Davis, Frederick S., West Roxbury.
1914 Deland, Mrs. Margaret, Boston.
1911 Dolansky, Frank J., Lynn.
1897 Dorr, George B., Boston.

1903 Evans, Frank H., Malden.

1902 Farlow, Mrs. William G., Cambridge.
1901 Fiske, Harry E., Wollaston.
1894 Fitzgerald, Desmond, Brookline.
1903 Freeman, Miss Harriet E., Boston.
1905 Fuld, Maurice, New York, N.Y.

1912 Gage, L. Merton, Groton.
1912 Goodwin, Mrs. Daniel, East Greenwich, R. I.
1900 Grey, Robert Melrose, Belmont, Cuba.
1897 Grey, Thomas J., Chelsea.

1907 Hall, Harry F., Moorestown, N. J.
1908 Hamilton, Mrs. George Langford, Magnolia.
1910 Handley, A. H., Newton.
1912 Hardy, John H., Jr., Littleton.
1894 Hatfield, T. D., Wellesley.
1910 Hayward, Mrs. W. E., Ipswich.
1891 Heustis, Warren H., Belmont.
1916 Hibbard, Miss Ann, West Roxbury.
1914 Higginson, Mrs. Alexander H., Manchester.
1902 Hildreth, Miss Ella F., Westford.
1902 Hill, Arthur Dehon, Boston.
1884 Hill, J. Willard, Belmont.
1912 Hollingsworth, Mrs. Sumner, Boston.
1913 Holmes, Eber, Montrose.
1913 Houghton, Mrs. Clement S., Chestnut Hill.
1900 Howden, Thomas, Prides Crossing.
1902 Hubbard, Allen, Newton Centre.
1893 Hubbard, F. Tracy, Boston.

1913 Jenkins, Edwin, Lenox.
1916 Jenks, Albert R., Springfield.
1903 Johnston, Robert, Lexington.

1898 Kelsey, Harlan P., Salem.
1898 Kennard, Frederic H., Newton Centre.
1912 Kirkegaard, John, Bedford.

1889 Lancaster, Mrs. E. M., Roxbury.
1900 Lawson, Joshua, Marshfield.
1914 Leach, C. Arthur, South Hamilton.
1914 Leary, Dr. Timothy, Jamaica Plain.
1904 Leuthy, A., Roslindale.
1902 Lewis, E. L., Taunton.
1896 Lincoln, Miss Agnes W., Medford.
1914 Longyear, Mrs. Mary Beecher, Brookline.
1901 Loring, Mrs. Thacher, Boston.
1896 Loring, William C., Beverly.
1903 Lumsden, David, Ithaca, N. Y.

1912 McCarthy, Nicholas F., South Boston.
1914 McGregor, Alexander, Malden.
1904 MacMulkin, Edward, Boston.
1890 Manning, A. Chandler, Wilmington.
1914 Morse, Frank E., Auburndale.
1913 Murray, Peter, Manomet.

1916 Nehrling, Prof. Arno H., Crawfordsville, Ind.
1895 Nicholson, William, Framingham.
1904 Nicol, James, Quincy.
1903 Nixon, J. Arthur, Taunton.

1913 O'Brien, Mrs. Edward F., Brookline.

1915 Parker, A. S., Stoneham.
1914 Parker, Miss Charlotte E., Ipswich.
1906 Parker, Eliab, Roxbury.
1892 Parker, Walter S., Reading.
1909 Parker, W. Prentiss, Roxbury.
1908 Peabody, Mrs. W. Rodman, Readville.
1914 Pembroke, A. A., Beverly.
1898 Pierce, Mrs. F. A., Brookline.
1902 Pritchard, John, Bedford Hills, N. Y.

1912 Proctor, Dr. Francis I., Wellesley.
1883 Purdie, George A., Wellesley Hills.
1913 Putnam, Frank P., North Tewksbury.

1906 Rane, Prof. F. W., Waban.
1897 Rea, Frederic J., Norwood.
1912 Reed, H. B., South Weymouth.
1914 Rees, Ralph W., Amherst.
1893 Rich, Miss Ruth G., Dorchester.
1888 Rich, William E. C., Ocean Park, Maine
1900 Robb, Peter B., Whitinsville.
1893 Robinson, Walter A., Arlington
1915 Rosenthal, Wolf, Boston.
1892 Ross, Henry Wilson, Newtonville.
1903 Ross, Walter D., Worcester.
1909 Russell, Charles F., Weston.
1910 Rust, William C., Brookline.

1907 Sanborn, Edward W., Boston.
1897 Sander, Charles J., Brookline.
1875 Saunders, Miss Mary T., Salem.
1896 Searles, E. F., Methuen.
1910 Sears, Prof. F. C., Amherst.
1907 Seaver, Robert, Jamaica Plain.
1886 Sharples, Stephen P., Cambridge.
1907 Sim, William, Cliftondale.
1915 Slamin, John, Wellesley.
1910 Smith, D. Roy, Boston.
1914 Smith, George N., Wellesley Hills.
1914 Spaulding, Mrs. Samuel S., Springfield Center, N. Y.
1914 Sprague, George H., Ipswich.
1914 Stevenson, Robert H., Readville.
1914 Storey, Mrs. Richard C., Boston.
1914 Sturgis, Miss Lucy Codman, Boston.
1904 Symmes, Samuel S., Winchester.

1869 Tailby, Joseph, Wellesley.
1914 Thayer, John E., Jr., Lancaster.
1909 Tracy, B. Hammond, Wenham.
1913 Tuckerman, Bayard, Ipswich.
1907 Turner, Everett P., Arlington.
1892 Tyndale, Theodore H., Boston.

1911 Ufford, Charles A., Dorchester.

1881 Vaughan, J. C., Chicago, Ill.

1915 Wadsworth, Ralph E., Northboro.
1902 Ware, Horace E., Milton.
1914 Washburn, Paul, Boston.
1914 Waterer, Anthony, 3d, Philadelphia, Pa.
1914 Waterer, Hosea, Philadelphia. Pa.
1889 Welch, Patrick, Dorchester.
1915 Wetterlow, Eric H., Manchester.
1909 Wheeler, George F., Concord.
1897 Wheeler, Henry A., Newtonville.
1905 White, Miss Margaret, Cambridge.
1901 Wilder, Miss Grace S., Dorchester.
1897 Wilkie, Edward A., Newtonville.
1913 Williams, Mrs. Emile F., Cambridge.
1889 Winter, William C., Mansfield.